North Carolina Department of Transportation
Statewide Planning Branch
Small Urban Planning Unit

Thoroughfare Plan for

TAYLORSVILLE
INCORPORATED 1879
1887
ALEXANDER COUNTY

December, 1995

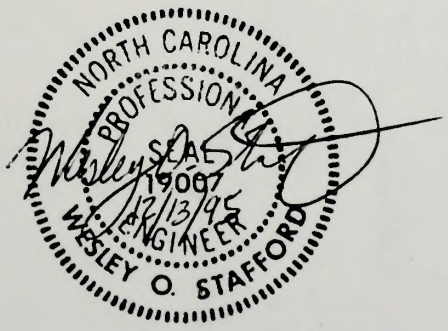
Thoroughfare Plan
For
Taylorsville, North Carolina

Prepared by the:

Statewide Planning Branch
Division of Highways
N. C. Department of Transportation

In Cooperation with:

The Town of Taylorsville
The Federal Highway Administration
U. S. Department of Transportation



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ACKNOWLEDGMENTS

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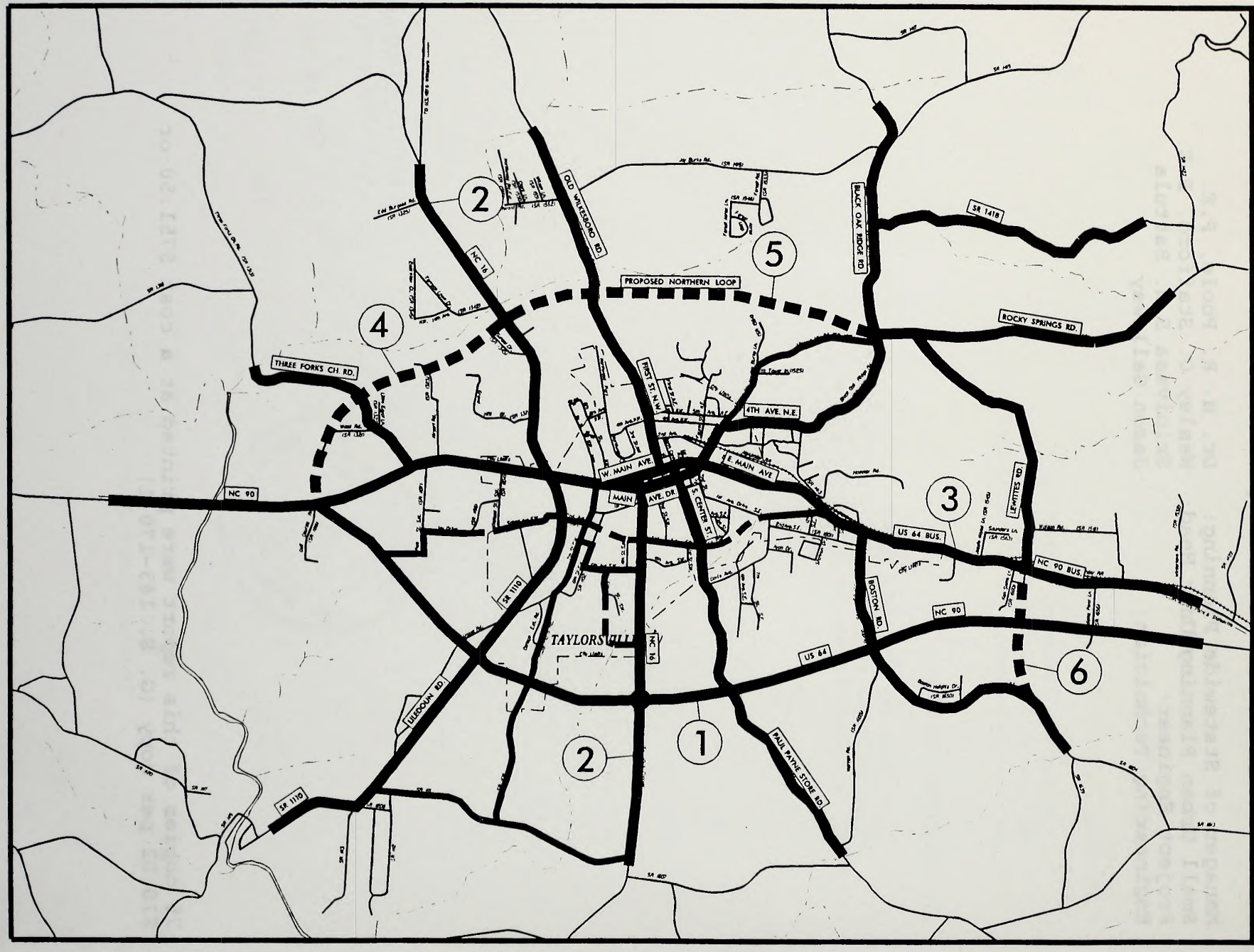


LEGEND

	existing	proposed
Major Thoroughfare		
Minor Thoroughfare		
Interchange		

Adopted by:

Taylorsville June 22, 1995

Recommended by Statewide Planning Branch July 11, 1995

NC Dept. of Transportation August 4, 1995

Public Hearing June 22, 1995

MAY 30, 1995

THOROUGHFARE PLAN

TAYLORSVILLE

Alexander County

North Carolina

N

scale in feet

Executive Summary

This plan documents the findings of a thoroughfare study for Taylorsville. Below is a listing and brief description of these findings:

Major Thoroughfares:

1. US 64 - Widen this newly constructed facility from a two-lane to a four-lane facility from Golf Course Lane (SR 1188) to Adams Pond Lane (SR 1656)

2. NC 16 - Widen the existing two-lane facility to three-lane from Macedonia Church Road (SR 1607) to Fifth Avenue S.W. Also widen NC 16 from two-lane to three-lane from NC 90 to SR 1326.

3. NC 90 - Widen from two-lane to a three-lane facility from SR 1422 to Boston Road (SR 1604).

4. Northwest loop - Construct a Northwestern loop from NC 90 West to Old Wilksboro Road (SR 1409)

5. Northeast loop - Construct a Northeastern loop from Black Oak Ridge Road (SR 1412) to Old Wilksboro Road (SR 1409)

6. Lewittes Road - Construct a connector from Lewittes Road (SR 1420) to Boston Road (SR 1604) through US 64

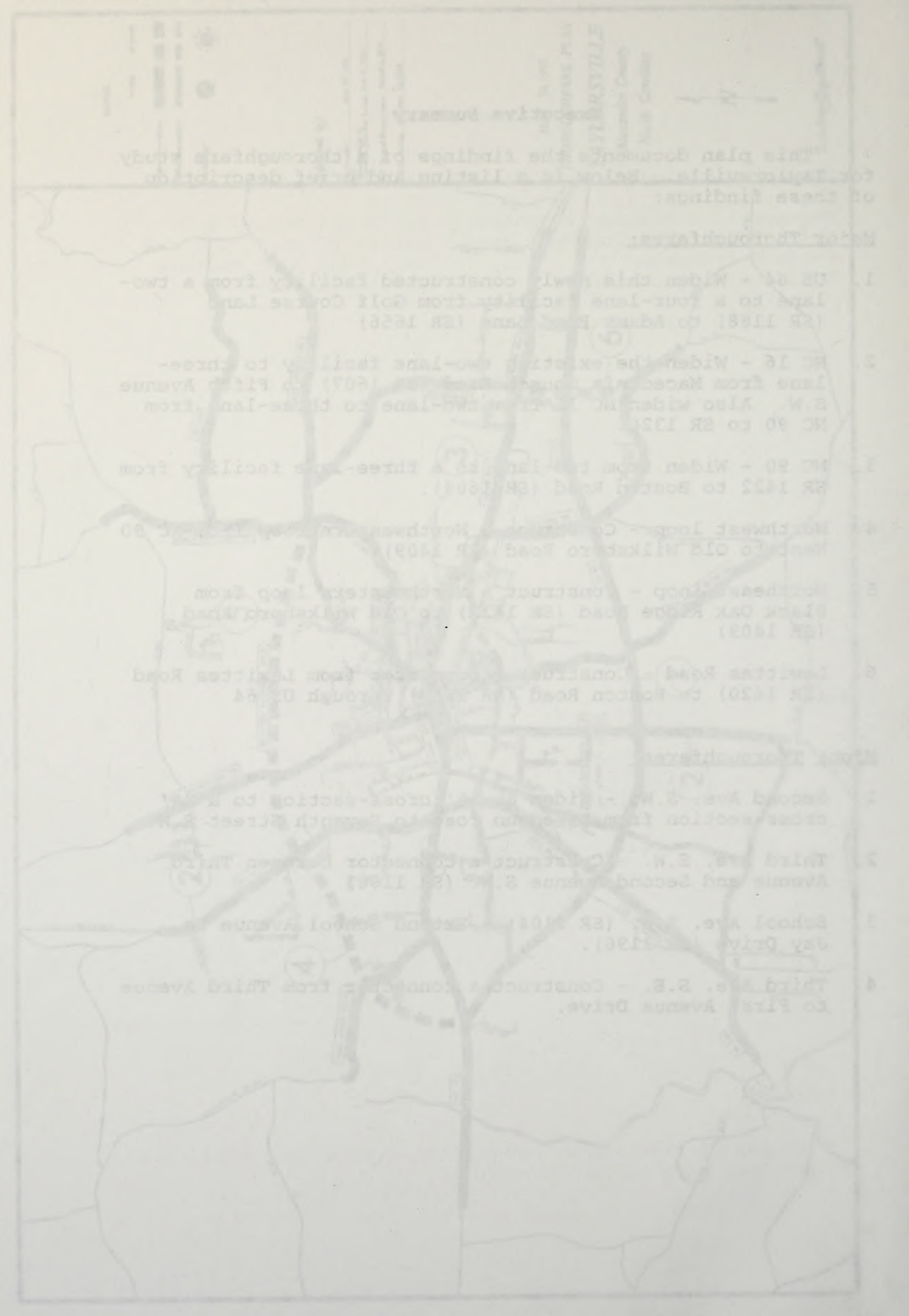
Minor Thoroughfares:

1. Second Ave. S.W. - Widen an 18' cross-section to a 24' cross-section from Liledoun road to Seventh Street S.W.

2. Third Ave. S.W. - Construct a connector between Third Avenue and Second Avenue S.W. (SR 1104)

3. School Ave. S.W. (SR 1104) - Extend School Avenue to Jay Drive (SR 1196).

4. Third Ave. S.E. - Construct a connector from Third Avenue to First Avenue Drive.



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I. Introduction

This report documents the finding of a study of the Taylorsville Thoroughfare System. This study was initiated in August 1994 and culminated in the mutual adoption of an updated Thoroughfare Plan on June 22, 1995. (Shown in Figure 2 on a map dated August 4, 1995).

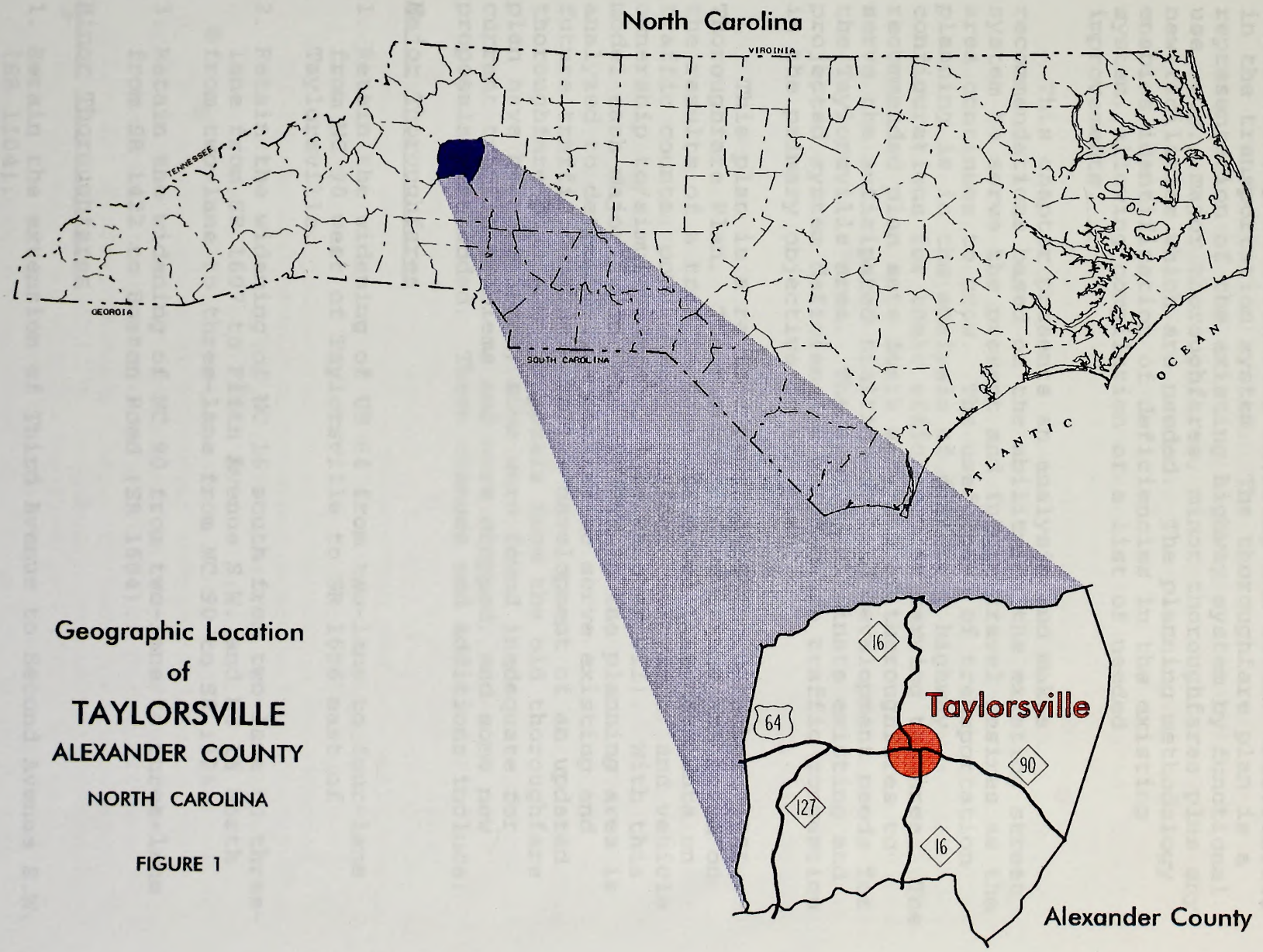
The purpose of this study was to re-examine the present and future transportation needs of the area, and from this derive a revised Thoroughfare Plan. The system of thoroughfares proposed was developed following the principles of thoroughfare planning outlined in Chapter VIII of this report.

The recommended cross-sections are based on existing conditions and the expected volume of traffic in the design year. Every effort was made to use as much of the existing street system as possible in order to minimize cost and environmental disruption. The location of new facilities was based on field investigation, existing land use, and topographic conditions.

Initiative for plan implementation rests with the policy boards and citizens of the area. Highway needs throughout the State exceed the available funding. Therefore, local areas should aggressively pursue funding for desired projects.

Responsibility for the proposed construction is shared by Taylorsville and the N. C. Division of Highways. With the different governmental agencies involved in providing the elements of the plan, coordination of activities is of prime importance. The plan is formally adopted by both the local governing bodies and the North Carolina Board of Transportation to serve as a mutual official guide in providing a well coordinated, adequate, and economical major street system. In order for the plan to be effective, the City and the State must procure in advance or protect by various legal controls the rights-of-way necessary for the improvements which will ultimately be required.

It must be emphasized that the Thoroughfare Plan was based on anticipated growth of the urban area, as provided by Taylorsville. Actual growth rates and patterns may differ from those anticipated and it may become necessary to accelerate or retard the development of thoroughfares or to make revisions in the proposed plan. It is desirable to review the plan in detail approximately every ten years to adjust the thoroughfare system to reflect the type and actual growth of development.



Geographic Location
of
TAYLORSVILLE
ALEXANDER COUNTY
NORTH CAROLINA

FIGURE 1

FIGURE 1

NORTH CAROLINA

MECKLENBURG COUNTY

AND

SURROUNDING COUNTIES

II. Recommended Thoroughfare Plan

A Thoroughfare plan study unfolds the need for new facilities, plus identifies existing and future deficiencies in the transportation system. The thoroughfare plan is a representation of the existing highway system by functional use, e.g., major thoroughfares, minor thoroughfares plus any new facilities which are needed. The planning methodology enables identification of deficiencies in the existing system, allowing compilation of a list of needed improvements.

This chapter presents an analysis and makes recommendations based on the ability of the existing street system to serve the present and future travel desires as the area continues to grow. The usefulness of transportation planning is in the analysis of different highway configurations for their efficiency in serving the area. The recommended plan sets forth a system of thoroughfares to serve the anticipated traffic and land development needs for the Taylorsville area. The need to eliminate existing and projected system deficiencies which cause traffic congestion is the primary objective of the plan.

This plan is a revised version of the December, 1981 Thoroughfare Plan. The recommended revisions are based on the results of a traffic forecast model that uses data on traffic counts, population, housing, employment, and vehicle ownership to simulate travel (see Chapter VII). With this model each major street and highway in the planning area is analyzed to determine its ability to serve existing and future traffic demands. In the development of an updated thoroughfare plan some proposals from the old thoroughfare plan have been retained, some were found inadequate for current traffic problems and were dropped, and some new proposals were added. These changes and additions include:

Major Thoroughfares

1. Retain the widening of US 64 from two-lane to four-lane from NC 90 west of Taylorsville to SR 1656 east of Taylorsville.

2. Retain the widening of NC 16 south from two-lane to three-lane from SR 1607 to Fifth Avenue S.W. and NC 16 North from two-lane to three-lane from NC 90 to SR 1326.

3. Retain the widening of NC 90 from two-lane to three-lane from SR 1422 to Boston Road (SR 1604).

Minor Thoroughfares

1. Retain the extension of Third Avenue to Second Avenue S.W. (SR 1104).

2. Retain the extension of Third Avenue to First Avenue Drive

3. Retain the extension of School Avenue to Jay Drive (SR 1196).

4. Retain the widening of Second Avenue from Liledoun road to Seventh Street from an 18' cross-section to a 24' cross-section.

Updated Thoroughfare Plan Recommendations

The process of developing, testing and evaluating alternate plans involved a number of considerations. These included Taylorsville's goals and objectives, identified deficiencies, environmental impacts, existing and anticipated land development, and travel services. Aerial photography, topographic mapping, field reconnaissance and discussion with local staff, officials and interested local citizens provided additional basis for identifying and evaluating alternate alignments. The following describes the plan in terms of its functional parts.

Bypass Facility

(1) US 64 - Volumes from 10,000 VPD to 13,000 VPD are expected by the design year. With these high volumes it is recommended this facility be widened to four lanes with a 60 foot median (Cross-Section A, Appendix B). Ample building line setbacks should be required if industrial plants decide to locate in the area.

Loop System

(1) Northwest Loop - This proposed loop facilitates circumferential travel movements in the northern and western parts of the planning area. With the growth in traffic volumes this loop would correct a system deficiency which presently forces traffic to come into the heart of the planning area solely to take another road back out to their destination. Design year traffic is anticipated to be 3,000 VPD from NC 90 (west) to NC 16 (north) and 6,500 VPD from NC 16 (north) to SR 1409. A two-lane, 24' wide cross-section (Cross Section K, Appendix B) is recommended for this facility.

(2) Northeast Loop - This proposed loop facilitates circumferential travel movements in the northern and eastern parts of the planning area. Design year traffic is anticipated to be 4,000 VPD. To accomodate this traffic a two-lane, 24' wide (Cross-Section K, Appendix B) is recommended.

Radial Streets

(1) NC 90 East - This road could be described as the most important facility serving the planning area since it not only carries traffic to the Central Business District (CBD), but also serves east-west travel between Statesville and Lenoir. Much of this traffic is due to industries located east of Taylorsville. Anticipated traffic by the year 2020 is 15,000 VPD. To provide for adequate movement three lanes are recommended (Cross-Section H, Appendix B) from SR 1422 to Boston Road (SR 1604).

(2) Boston Road (SR 1604) - Design year traffic is 4,500 VPD. No improvements are recommended.

(3) South Center Street (SR 1605) - This street provides access to town for outlying areas south of Taylorsville. With residential growth expected in the southern part of the planning area this road will play a major role in serving the future needs of these residents. Year 2020 traffic is expected to be 2,000 VPD. No improvements are recommended.

(4) NC 16 South - This route along with its northern counterpart carries the second highest quantity of vehicles in the Taylorsville area. Expected traffic for the year 2020 is 13,000 VPD from the southern planning area boundary to US 64 and 7,000 VPD from US 64 to the Central Business District. To accommodate this traffic by the design year widening from a two-lane to a three-lane facility (Cross-Section H, Appendix B) is recommended.

(5) College Extension Road (SR 1109) - Anticipated design year traffic is 4,000 VPD. No improvements are recommended.

(6) Liledoun Road (SR 1110) - This route enables residents in the southwestern Taylorsville to access NC 90 and continue directly into NC 16 (north). Due to heavy traffic in the school area, turn lanes to accommodate school traffic are recommended. Expected traffic by the year 2020 will be 3,000 VPD. Widening of this facility from a two-lane to three-lanes (Cross-Section H, Appendix B) is required.

(7) NC 90 West - NC 90 serves as a major route between Statesville and Lenoir. With US 64 in place, through traffic is diverted off the central business district, thus relieving a lot of congestion. Anticipated traffic by the year 2020 will range from 12,000 VPD in the outskirts to 5,000 VPD in the corporate limits. No improvements are recommended.

(8) Three Forks Road (SR 1313) - Anticipated design year traffic is 1,500 VPD. No improvements are recommended.

(9) NC 16 North - This facility allows for the north-south travel to and from Wilkesboro. Expected traffic by the year 2020 can reach as high as 13,000 VPD. This road needs to widened to a three-lane facility (Cross-Section H, Appendix B) to accommodate the design year traffic.

(10) First Street N.W. (SR 1409) - This facility provides the most direct access between the areas north of Taylorsville, where residential growth is modest. Traffic volumes by the year 2020 can reach 6,000 VPD. No improvements are recommended.

(11) Fourth Avenue, N.E.- Black Oak Ridge Road - This road serves the northeast section of the planning area. Residential growth is low in this area due to rough topography. Year 2020 traffic can reach 2,000 VPD. No improvements are recommended.

(12) Main Avenue Drive-Marsh Avenue Drive - This road serves the needs of the residents in the northeast. This facility is anticipated to carry 1,500 VPD by the year 2020. Hence no improvements are recommended.

(13) SR 1419 - The anticipated design year traffic volumes on this facility is 2,000 VPD. No improvements are recommended.

Crosstown Streets

(1) West Main Avenue - This facility carries the majority of the east-west traffic through the central business district of Taylorsville. Due to the direct alignment, this route has become popular both to the residents and to the truckers from the industrial plants and is by far the most widely used facility. With the new bypass ready to be opened, there will be a significant relief of traffic on this route especially truck traffic. 2020 traffic volumes are estimated at 12,000 VPD.

(2) Main Avenue Drive - This facility is the counterpart of West Main Avenue and serves east-west movement through the CBD. Year 2020 traffic volumes are anticipated to be 2,500 VPD.

(3) Center Street - This facility serves as the major north-south route through the center of the town. Design year traffic for this section is anticipated to approach 3,000 VPD.

(4) Lewittes Road (SR 1420) - This facility currently serves the north-eastern section of the town. The current traffic on this road is approximately 1000 VPD. Design year traffic is estimated at 3500 VPD with the north-east loop in place. With the extension of Lewittes road to US 64 the loop system will be complete and there will be a circumferential flow of traffic around the town. Therefore, it is recommended that this road be extended to US 64 with a four-lane, 48' facility (Cross-Section G, Appendix B) and continuing as a two-lane, 24' facility (Cross-Section K, Appendix B) connecting Boston Road (SR 1604).

Minor Thoroughfares

In addition to the proposed improvements recommended above, there are several facilities which have been designated as minor thoroughfares which comprise the remainder of the thoroughfare system. Minor thoroughfares differ from major ones primarily by being the initial or final link in a trip route (collector-distributor) rather than an intermediate one (arterial). This means that these facilities are more oriented towards providing land access to an area rather than moving traffic through it. Minor thoroughfares with anticipated design year traffic given the plan's implementation are listed below:

(1) First Avenue Drive - This facility presently carries a large amount of traffic due to its proximity to East Main Avenue. Industrial plants east of the town attract a large number of employees. In trying to bypass the CBD drivers are using First Avenue Drive which is not designed to accommodate a lot of traffic.

First Avenue Drive connector, which joins the named facility and Third Avenue S.W., will be part of a minor thoroughfare system used to collect and distribute traffic. 2020 traffic volumes on this route are anticipated to be 2,000 VPD and if the proposed connector is built the volume will increase to 4,000 VPD. A two-lane, 24' wide facility (Cross-Section K, Appendix B) is recommended.

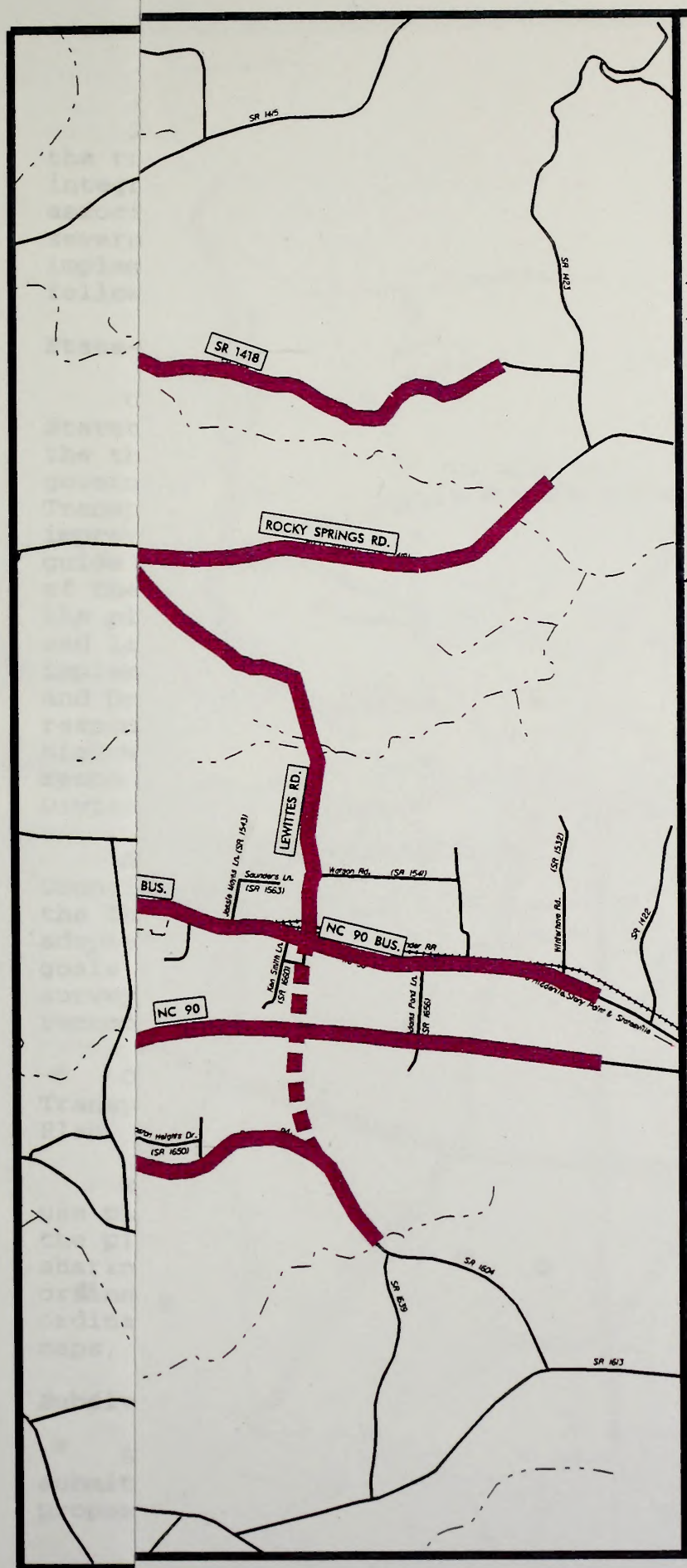
(2) Third Avenue Drive - This facility allows for movements within the corporate limits and serves as another link in the minor thoroughfare system. Design year traffic volumes are anticipated to be 2,000 VPD.

(3) School Avenue S.W. (SR 1104) - This route serves mostly as a traffic route for the area high school. Traffic from this facility is dispersed on Milstead Street (SR 1105), Liledoun Road (SR 1110), and College Extension

Road (SR 1109). By providing the necessary links for this minor thoroughfare, east-west travel movements will be possible without the use of NC 90. 2,000 VPD are anticipated by the year 2020.

(4) Jay Drive (SR 1196) - Along with the School Avenue S.W. (SR 1104) extension to provide for a continuous route, this facility will allow access to US 64. Expected traffic for the year 2020 is 1,000 VPD.

FIGURE 2



LEGEND

	existing	proposed
Major Thoroughfare	▬▬	▬ ▬ ▬
Minor Thoroughfare	▬▬	- - -
Interchange	●	◌

Adopted by:

Taylorsville	June 22, 1995
Recommended by Statewide Planning Branch	July 11, 1995
NC Dept. of Transportation	August 4, 1995
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THOROUGHFARE PLAN

TAYLORSVILLE

Alexander County

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scale in feet

Road (SR 1109). By providing the necessary links for this minor thoroughfare, east-west travel movements will be possible without the use of NC 90. 2,000 VPD are anticipated by the year 2020.

(4) Jay Drive (SR 1196) - Along with the School Avenue S.W. (SR 1104) extension to provide for a continuous route, this facility will allow access to US 64. Expected traffic for the year 2020 is 1,000 VPD.

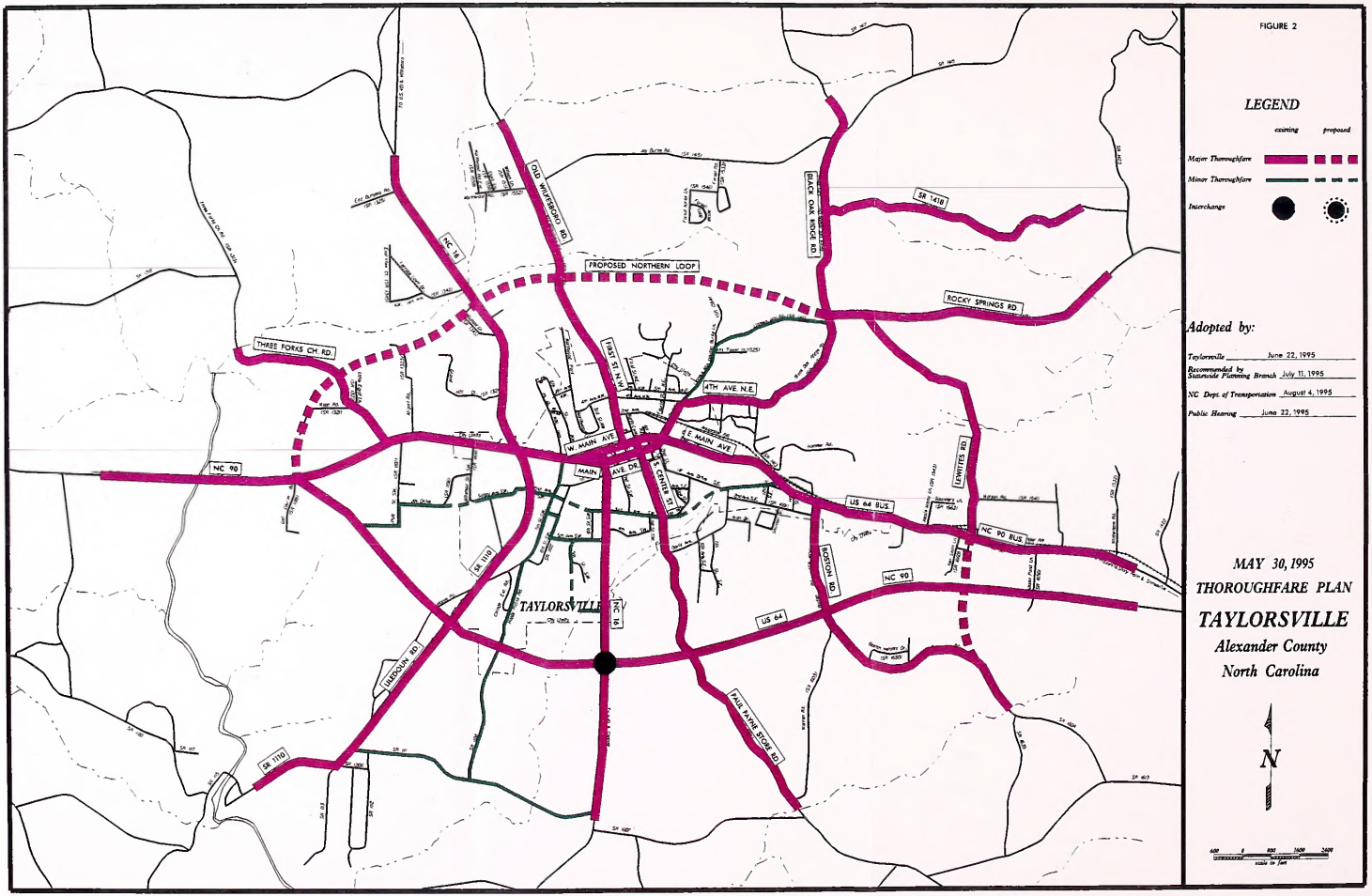

FIGURE 2

LEGEND

	existing	proposed
Major Thoroughfare		
Minor Thoroughfare		
Interchange		

Adopted by:

Taylorsville June 22, 1995

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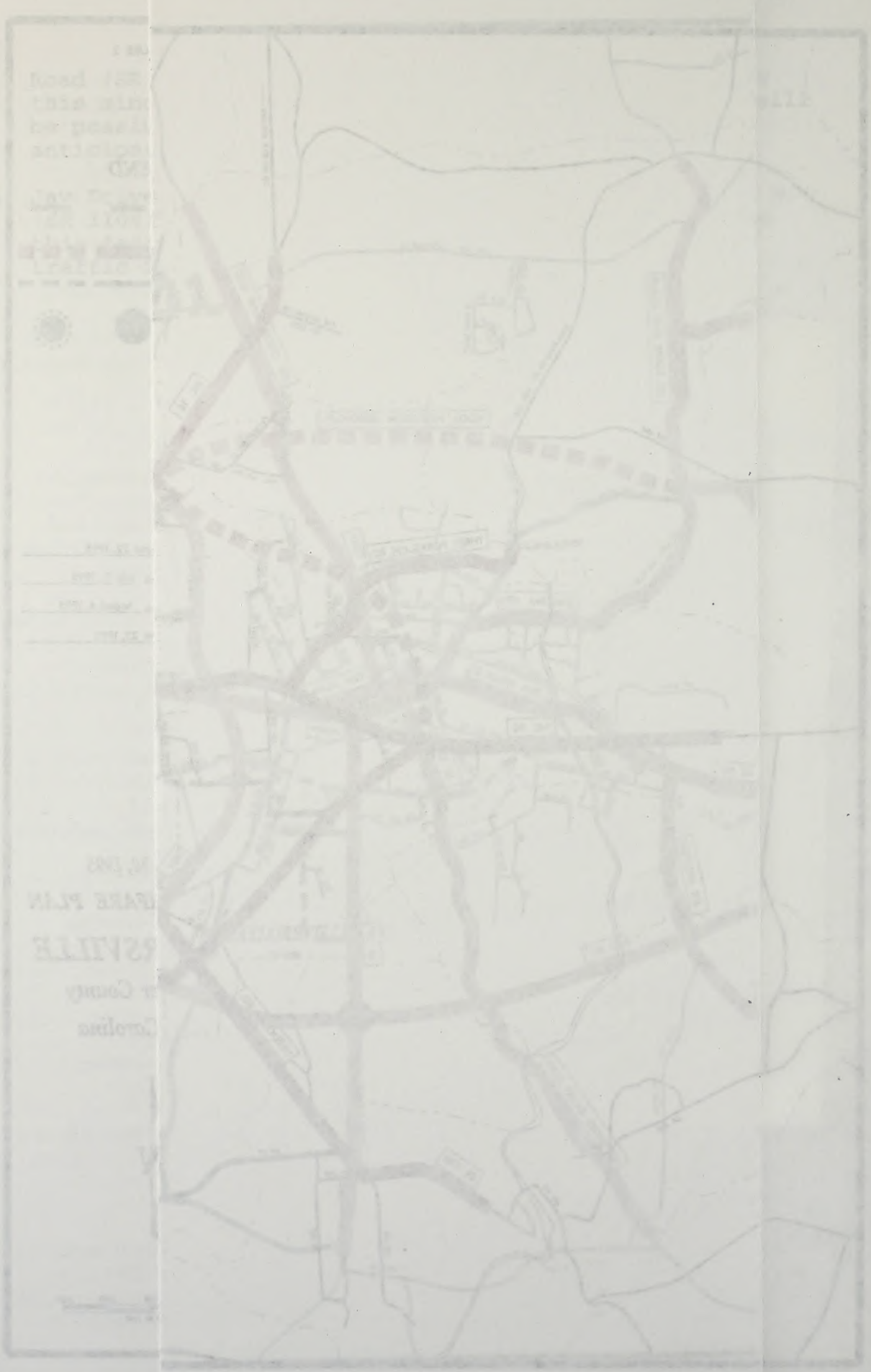


III. IMPLEMENTATION

Implementation is one of the most important aspects of the transportation plan. Unless implementation is an integral part of this process, the effort and expense associated with developing the plan is lost. There are several tools available for use by the town to assist in the implementation of the thoroughfare plan. They are as follows:

State-Municipal Adoption of the Thoroughfare Plan

Chapter 136, Article 3A, Section 136-66.2 of the General Statutes of North Carolina provides that after development of the thoroughfare plan the plan may be adopted by the governing body of the municipality and the Board of Transportation as the basis for future street and highway improvements. The mutually approved plan now serves as a guide for the Department of Transportation in the development of the road and highway system for the town. The approval of the plan by the town also enables standard road regulations and land use controls to be used effectively in the implementation of this plan. As part of the plan, the Town and Department of Transportation shall reach agreement in the responsibilities for existing and proposed streets and highways. Facilities which are designated a State responsibility will be constructed and maintained by the Division of Highways.

A Public Hearing was conducted by the Taylorsville City Council on June 22, 1995 to allow for additional comments on the Thoroughfare Plan. As a result, the Plan was unanimously adopted. Additional Public Input included distribution of goals and objectives survey forms. The results of this survey were analyzed and used towards the development of a recommended thoroughfare plan (See Appendix C).

On August 4, 1995, the North Carolina Board of Transportation formally adopted the Taylorsville Thoroughfare Plan.

Mutual adoption of the Thoroughfare Plan lets officials use planning tools available to them for implementation of the plan. These include: City funding, Federal revenue sharing or block grants, urban bonds, redevelopment, zoning ordinances, advance purchase of rights-of-way, subdivision ordinances, future street line ordinances, official street maps, and lobbying for state construction.

Subdivision Controls

Subdivision regulations require every subdivider to submit to the County Planning Commission a plan of any proposed subdivision. It also requires that subdivisions be

right-of-way for projected roads and highways that are to become a part of the thoroughfare plan. The construction of subdivision streets to adequate standards reduces maintenance costs and simplifies the transfer of streets to the State Highway System. Appendix D outlines the recommended subdivision design standards as they pertain to road construction.

Land Use Controls

Land use regulations are an important tool in that they regulate future land development and minimize undesirable development along roads and highways. The land use regulatory system can improve highway safety by requiring sufficient setbacks to provide for adequate sight distances and by requiring off-street parking.

Development Reviews

Driveway access to a State-maintained street or highway is reviewed by the District Engineer's office and by the Traffic Engineering Branch of the North Carolina Department of Transportation. In addition, any development expected to generate large volumes of traffic (e.g., shopping centers, fast food restaurants, or large industries) may be comprehensively studied by staff from the Traffic Engineering Branch, Planning and Environmental Branch, and/or Roadway Design Unit of NCDOT. If done at an early stage, it is often possible to significantly improve the development's accessibility while preserving the integrity of the thoroughfare plan.

Funding Sources

Capital Improvements Program

A Capital improvement program makes it easier to build a planned thoroughfare system. This capital improvement program consists of two lists of projects. The first is a list of highway projects that are designated as a municipal responsibility and are to be implemented with municipal funds. The second is a list of local projects designated as State responsibility to be included in the Transportation Improvement Program.

Transportation Improvement Program

North Carolina's Transportation Improvement Program (TIP) is a document which lists all major construction projects the Department of Transportation plans for the next seven years. Similar to local Capital Improvement Program projects, TIP projects are matched with projected funding sources. Each year when the TIP is updated, completed projects are removed, programed projects are advanced, and

sources. Each year when the TIP is updated, completed projects are removed, programed projects are advanced, and new projects are added.

During annual TIP public hearings, municipalities request projects to be included in the TIP. A Board of Transportation member reviews all of the project requests in a particular area of the state. Based on the technical feasibility, need, and available funding, the board member decides which projects will be included in the TIP. In addition to highway construction and widening, TIP funds are available for bridge replacement projects, highway safety projects, public transit projects, railroad projects, and bicycle projects.

Industrial Access Funds

If an Industry wishes to develop property that does not have access to a state maintained highway and certain economic conditions are met, then funds may be made available for construction of an access road.

Small Urban Funds

Small Urban Funds are annual discretionary funds made to municipalities with qualifying projects. The maximum amount is $1 million per year per Division. A City may have multiple projects. Requests for Small Urban Fund assistance should be directed to the appropriate Board of Transportation member and Division Engineer.

The North Carolina Highway Trust Fund Law

The Highway Trust Fund Law was established in 1989 with four major goals for North Carolina's roads and highways. These goals are:

1. To complete the remaining 1,716 miles of four lane construction on the 3,600 mile North Carolina Intrastate System.

2. To construct a multilane connector in Asheville and portions of multilane loops in Charlotte, Durham, Greensboro, Raleigh, Wilmington, and Winston-Salem.

3. To supplement the secondary roads appropriation in order to pave, by 1999, 10,000 miles of unpaved secondary roads carrying 50 or more vehicles per day, and all other unpaved secondary roads by 2006.

4. To supplement the Powell Bill Program.

In this 25-year planning period, Taylorsville should

TABLE 1

Funding Sources and Methods Recommended for Implementation of Projects

PROJECT	Funding Sources				Methods of Implementation				
	Local Funds	TIP Funds	Indust. Access	Small Urban	T-fare Plan	Subdiv. Ord.	Zoning Ord.	Future Street Lines	Development Review
US 64 widening		X			X				X
NC 90 Widening		X			X				X
NC 16 North Widening		X			X				X
NC 16 South Widening		X			X				X
North East Loop		X			X				X
North West Loop		X			X				X
Lewittes Rd. Extension		X			X				X
Second Avenue Widening	X				X				X
3rd. Avenue S.W. connector	X				X			X	X
School Avenue connector	X				X			X	X
3rd. Avenue S.E. connector	X				X			X	X

look forward to the paving of most, if not all, of its unpaved roads on the State maintained system.

For more information on the Highway Trust Fund Law, contact the Program Development Branch of the North Carolina Department of Transportation.

Construction Priorities and Cost Estimates

Construction priorities will vary depending on what criteria are considered and what weight is attached to the various criteria. Most people would agree that improvements to the major thoroughfare system and major traffic routes would be more important that minor thoroughfares where traffic volumes are lower. To be in the North Carolina Transportation Improvement Program, a project must show favorable benefits relative to costs and should not be prohibitively disruptive to the environment. The potential cost estimate of eleven Taylorsville projects with respect to the user benefits, probability that economic development will be stimulated and environmental impacts is given in Table 4.

Reduced road user cost should result from any roadway improvement, from a simple widening to the construction of a new roadway to relieve congested or unsafe conditions. Comparisons of the existing and the proposed facilities have been made in terms of vehicle operating costs, travel time costs, and accident costs. These user benefits are computed as total dollar savings over the 30 year design period using data such as project length, base year and design year traffic volumes, traffic speed, type of facility, and volume/capacity ratio.

The impact of a project on economic development potential is shown as the probability that it will stimulate the economic development of an area by providing access to developable land and reducing transportation costs. It is a subjective estimate based on the knowledge of the proposed project, local development characteristics, and land development potential. The probability is rated on a scale from 0 (none) to 1.00 (excellent).

The environmental impact analysis considers the effect of a project on the physical, social/cultural, and economic environment. Below area listed the thirteen items that are considered when evaluating the impacts on the environment. They are: (1) air quality, (2) water resources, (3) soils and geology, (4) wildlife, (5) vegetation, (6) neighborhoods, (7) noise, (8) educational facilities, (9) churches, (10) parks and recreational facilities, (11) historic sites and landmarks, (12) public health and safety and (13) aesthetics. The summation of both positive and negative impact probabilities with respect to these factors provides a measure of the relative environmental impacts of a project.

Offsetting the benefits that would be derived from any project is the cost of its construction. A new facility, despite its high projected benefits, might prove to be unjustified due to the excessive costs involved in construction. The highway costs estimated in this report are based on the average statewide construction costs for similar project types. An estimate of anticipated right-of-way costs is also included. Table 4 evaluates the proposed taylorsville projects with respect to user benefits, estimated costs, probability of economic development, and environmental impact.

Table 2 may be used as a guideline for interpreting the "Probable Impact" values in Table 4.

TABLE 2

Probability Estimation Guide

Subjective Evaluation	Impact Probability
Excellent - very Substantial	1.00
Very good - substantial	0.75
Good - considerable	0.50
Fair - some	0.25
Poor - none	0.00

TABLE 3

Potential Project Cost Estimates of Investigated Projects

Project	Project Description	R/W Cost	Total Cost
1	US 64 widening from 2 lanes to 4	$0	$2,529,000
2	NC 90 widening, SR 1422 to Boston Rd., 2 lanes to 3	$36,200	$1,440,000
3	NC 16 (North) widening, NC 90 to SR 1326, 2 lanes to 3	$31,700	$1,402,000
4	NC 16 (South) widening, SR 1607 to 5th Ave. S.W., 2 lanes to 3	$28,400	$1,253,000
5	Northeast Loop from SR 1409 to SR 1412	$24,100	$1,506,000
6	Northwest Loop from NC 90 @ SR 1188 to SR 1409	$31,400	$1,968,000
7	Lewittes Road extension to Boston Road (SR 1604)	$214,800	$969,000
8	Second Ave. S.W. widening from 18' c/s to 24' c/s	$1,100	$58,000
9	3rd Ave. S.W. connector between 3rd Ave. and SR 1104	$408,400	$714,000

TABLE 3 (Contd.)			
Potential Project Cost Estimates of Investigated Projects			
Project	**Project Description**	**R/W Cost**	**Total Cost**
10	School Ave. S.W. connectorfrom School Ave. to Jay Drive	$5,500	$207,000
11	3rd Ave. S.E. connector from 3rd Ave. to 1st Ave. Drive	$107,500	$380,000

TABLE 4						
Benefits Evaluation for Investigated Projects						
Project	Benefits (1000's)	Costs (1000's)	Length Km.	Benefits per Km.	Econ. Dev. Potential	Environ. Impact
US 64 widening	$5,827	$2,529	3.89	$1,498	0.90	+0.5 -0.0
NC 90 widening	$2,172	$1,440	3.12	$ 692	0.50	+0.25 -0.0
NC 16 North widening	$14,214	$1,402	2.74	$5,188	0.50	+0.50 -0.0
NC 16 South widening	$13,488	$1,253	2.45	$5,505	0.75	+0.50 -0.25
N.E. Loop	$ 753	$1,506	2.28	$ 330	0.90	+0.50 -0.0
N.W. Loop	$1,192	$1,968	2.98	$ 400	0.90	+0.50 -0.0
Lewittes Rd Extension	$2,634	$969	1.16	$2,271	0.50	+0.0 -0.25
Second Ave. widening	$1,962	$58	0.19	$10,326	0.20	+0.0 -0.0
3rd.Ave.S.W connector	$3,464	$714	0.47	$7,370	0.20	+0.0 -0.25
School Ave. connector	$ 83	$207	0.31	$ 268	0.30	+0.0 -0.0
3rd.Ave.S.E connector	$ 669	$380	0.42	$1,593	0.30	+0.25 -0.25

IV. Travel Deficiency Analysis of Existing System

This chapter presents an analysis of the ability of the existing street system to serve the area's travel desires. Emphasis is placed not only on detecting the deficiencies, but on understanding their cause. Travel deficiencies may be localized as a result of substandard highway design, inadequate pavement width, or intersection controls. Alternately, the underlying problem may be caused by a system deficiency such as a need for a bypass, loop facility, construction of missing links, or additional radials.

Existing Travel Patterns

An indication of the adequacy of the existing street system is a comparison of traffic volumes versus the ability of the streets to move traffic. In an urban area, a street's ability to move traffic is generally controlled by the spacing of major intersections, access control, width of pavement, and the traffic control devices (such as signals) utilized.

Capacity is the maximum number of vehicles which has a "reasonable expectation" of passing over a given section of a roadway, during a given time period under prevailing roadway and capacity of the roadway will determine the **level of service (LOS).** Six levels of service identify the range of possible conditions. Figure 3 shows the levels of congestion associated with the various levels of service. Table 5 gives a brief description of each LOS in accordance with the 1994 Highway Capacity Manual.

Design requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each road or highway section must be individually analyzed and its design requirements determined by the amount and type of projected traffic, existing capacity, desired level of service, and available right of way. The recommended improvements and overall design of the Thoroughfare Plan were based on achieving a minimum of LOS D on existing facilities, and LOS C on new facilities. LOS D is considered the **"practical capacity"** of a facility, or that at which the public begins to express dissatisfaction.

Table 5

Level of Service

LOS A - Describes primarily free flow conditions. The motorist experiences a high level of physical and psychological comfort. Vehicles are spaced at an average of 440 ft at a maximum density of 12 passenger cars per mile per lane (pc/mi/ln). Minor disruptions to flow are easily absorbed at this level without a change in travel speed. Maneuverability within the traffic stream is good.

LOS B - also represents reasonably free flow conditions although the presence of other vehicles begins to be noticeable. Vehicles area spaced at an average of approximately 264 ft at a maximum density of 20 pc/mi/ln. The ability to maneuver within the traffic stream is only slightly restricted.

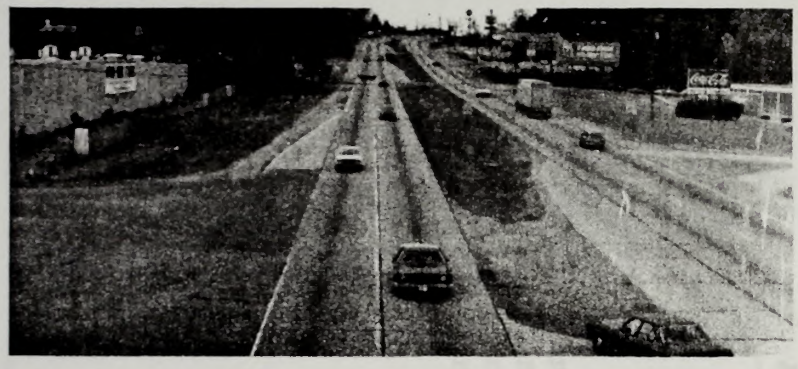
LOS C - provides for stable operations, but flows approach the range in which small increases will cause substantial deterioration in service. Freedom to maneuver within the traffic stream is affected by the presence of other vehicles. The average spacing of vehicles is reduced to approximately 189 ft at a maximum density of 28 pc/mi/ln. Minor incidents may still be absorbed, but the local decline in service will be great. Queues may be expected to form behind any significant blockage.

LOS D - represents a range in which ability to maneuver is severely restricted because of traffic congestion. Travel speed begins to be reduced by increasing volumes. The average spacing of vehicles is 155 ft at a maximum density of 34 pc/mi/ln. Freedom to maneuver is severely limited, and the driver experiences drastically reduced comfort levels. Minor incidents can be expected to create substantial queuing.

LOS E - represents operations at or near capacity and is quite unstable. The densities at LOS E vary depending upon the free flow speed. For the majority of multi-lane highways with free-flow speeds between 45 and 60 mph, passenger-car speeds at capacity range from 40 to 55 mph but are highly variable and unpredictable within that range. Any disruption to the traffic stream, such as a vehicle entering from a ramp, or changing lanes, requires the following vehicles

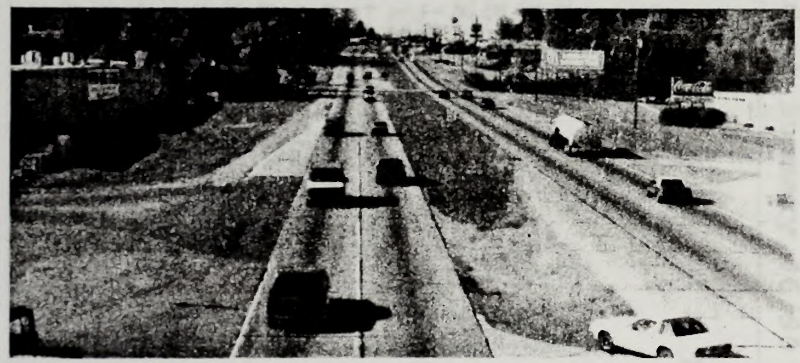
to give way to admit the vehicle. This condition establishes a disruption wave which propagates through the upstream traffic flow. At capacity, the traffic stream has no ability to dissipate any disruption. Any incident can be expected to produce a serious breakdown with extensive queuing.

LOS F - represents forced or breakdown flow. It occurs either at a point where vehicles arrive at a rate greater than the rate at which they are discharged or at a point on a planned facility where forecast demand exceeds computed capacity. Although operations at such points will appear to be at capacity, queues will form behind these breakdowns. Average travel speeds with queues are generally less than 30 mph.

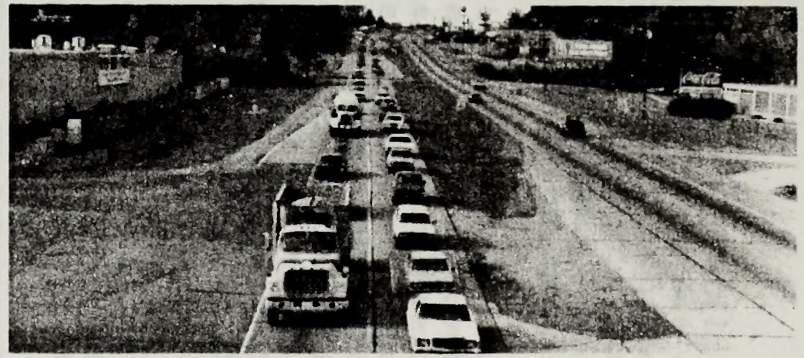


LEVEL OF SERVICE - A

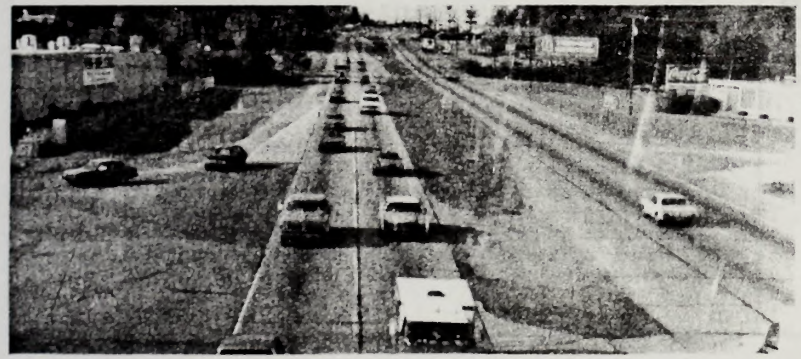
LEVEL OF SERVICE - D



LEVEL OF SERVICE - B



LEVEL OF SERVICE - E



LEVEL OF SERVICE - C

LEVEL OF SERVICE - F

LEVELS OF SERVICE

Figure 3

FIGURE 3

LEVELS OF SERVICE

LEVEL OF SERVICE - C

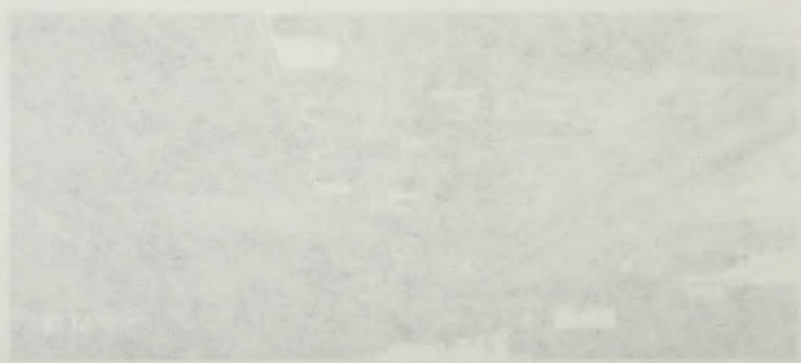
LEVEL OF SERVICE - F

LEVEL OF SERVICE - B

LEVEL OF SERVICE - E

LEVEL OF SERVICE - A

LEVEL OF SERVICE - D



Traffic Accidents

High Accident Location - Traffic accident records are of assistance in defining problem areas and often pinpoint a deficiency such as poor design, inadequate signing, ineffective parking, or poor sight distance. Accident patterns developed from analysis of accident data can lead to remedial action reducing the number of accidents.

Both the severity and number of accidents should be considered when investigating accident data. The severity of every accident is measured with a series of weighting factors developed by NCDOT's Division of Highways. In terms of these factors, a fatal or incapacitating accident is 47.7 times more severe than one involving only property damage, and an accident resulting in minor injury is 11.8 times more severe than one with only property damage. Table 6 is a summary of accidents in Taylorsville from June 1990 through May 1993.

The "Total" column indicates the total number of accidents reported within two hundred (200) feet of the intersection during the indicated time period. The severity listed is the average accident severity for that location.

TABLE 6

Accident Summary 06/90 to 05/93

LOCATION	TOTAL	SEVERITY
1. NC 90 and SR 1188	2	32.50
2. NC 90 and SR 1313	3	7.03
3. NC 16 and SR 1111	6	7.03
4. SR 1110 and SR 1111	3	13.07
5. SR 1110 and SR 1113	4	1.00
6. SR 1409 and SR 1549	3	13.07
7. SR 1600 and SR 1605	5	1.00
8. NC 90 and NC 16	16	9.46
9. NC 90 and SR 1110	2	10.05
10. NC 90 and Boston Road	6	7.03
11. NC 90 and First St. N.W.	4	21.28
12. NC 90 and Liledown Road	11	13.31
13. NC 90 and Main Avenue	10	8.24
14. NC 90 and Saunders	2	41.55
15. NC 90 and Seventh St. N.W.	4	10.05
16. NC 90 and Sixth St. N.W.	3	1.00
17. NC 16 and Fifth Ave. S.W.	5	17.22
18. NC 16 and First Ave. S.W.	5	4.62
19. NC 16 and Main Ave.	10	8.24
20. NC 16 and Third Ave. S.W.	2	1.00

Accident Summary 06/90 to 05/93		
21. Center St. and First Ave. S.W.	4	5.53
22. Center St. and W. Main Ave.	8	1.00
23. Center St. and Third Ave. S.W.	7	11.34
24. Fifth Ave. S.W. and Third St.	5	11.86
25. First St. S.W. and First Ave.	2	1.00
26. First St. S.W. and Fourth Ave.	2	10.05
27. First St. S.W. and W. Main Ave.	22	5.94
28. First St. S.W. and Second St.	6	7.03
29. First Ave. S.W. and Seventh St.	2	1.00
30. First Ave. Dr. S.E. and Third St.	11	10.02
31. Fourth St. and Main	5	4.62
32. Fourth St. and Third	3	13.07
33. Fourth St. and Zion	2	32.50
34. Liledown and Main	2	1.00
35. Liledown and School	3	1.00
36. Liledown and Second	3	1.00
37. Main and Main	11	2.65
38. Main and Milstead	4	5.53
39. Main and Second	6	4.02
40. Main and Seventh	6	10.05
41. Main and Third	10	2.81
42. Second and Seventh	2	1.00
43. Second and Third	2	10.05
44. Third and Third	3	13.07

1994 Traffic Capacity Analysis

Capacity Deficiencies - Figure 4 illustrates the base year (1994) major street system, and the **ADT** (Average Daily Traffic). A comparison of the base year ADT to capacities reveals several streets near or over practical capacity (LOS D). These areas are highlighted, and include:

Main Avenue Drive S.W. - From NC 16 to West Main Avenue is currently over capacity. The capacity of this section is 12,000 vpd (vehicles per day). Currently approximately 12,200 vpd are using this section of roadway. Also the segment of West Main Avenue is approaching capacity. The traffic on this section is 11,500 vpd. The US 64 bypass ready to be opened for traffic soon will alleviate the current traffic problems in the central business district (CBD). If no improvements are made on NC 90 in and around CBD the 2020 traffic is estimated at 12,000 vpd.

Third Street S.W. - From Third Avenue S.W. to Main Avenue Drive is a two-lane facility with a cross-section of 12,000 vpd. It is currently carrying 10,500 vpd. By the design year this volume is projected to 10,800 vpd. This is due to the bypass which will divert traffic off NC 16.

NC 90 - From Boston Road to First Avenue Drive S.E. has a capacity of 11,000 vpd. The base year average daily traffic volume was 9,500 vpd. By the year 2020 volumes are expected to increase to 12,000 vpd.

No Build Alternative - Not implementing a thoroughfare plan or elements of it could be called a No-Build Alternative. This means that there would be no new construction or roadway improvements to the Taylorsville thoroughfare system except for routine maintenance. If no improvements are made during the planning period there will be increased traffic volumes along the US 64 bypass, NC 16 and NC 90. This results in a reduction of LOS on the major thoroughfares. Figure 5 shows the existing system assuming that no improvements are made by the design year.

1994 Traffic Capacity Analysis

Capacity Deficiencies - Figure 4 illustrates the base year (1994) major street system, and the ADT (Average Daily Traffic). A comparison of the base year ADT to capacities reveals several streets near or over capacity (Level of Service (LOS D)). These areas are highlighted and include:

Main Avenue Drive S.W. - From NC 90 to West Main Avenue is currently over capacity. The capacity of this section is 12,000 vpd (vehicles per day) [illegible]. Approximately 12,200 vpd are using this section of roadway. Adjacent segment of West Main Avenue is approaching capacity. The traffic on this section is 11,200 vpd. The US 64 bypass ready to be opened for traffic soon will alleviate the current traffic problems in the central business district (CBD). If no improvements are made on NC 90 in and around CBD the 2020 traffic is estimated at 12,000 vpd.

Third Street S.W. - From Third Avenue S.W. to Main Avenue Drive is a two-lane facility with a capacity of 12,000 vpd. It is currently carrying [illegible] vpd. By the design year this volume is projected to [illegible] vpd mainly due to the bypass which will divert traffic from the [illegible].

NC 90 - From Boston Road to First Avenue Drive S.E. has a capacity of 11,000 vpd. The base year Average Daily traffic volume was 8,500 vpd. By the year 2020 volumes are expected to increase to 12,000 vpd.

No Build Alternative - Not implementing a thoroughfare plan or elements of it could be called a No-Build Alternative. This means that there would be no new construction or roadway improvements to the Taylorsville thoroughfare system except for routine maintenance. If no improvements are made during the planning period there will be increased traffic volumes along the US 64 bypass, NC 16 and NC 90. This results in a reduction of LOS on the major thoroughfares. Figure 5 shows the existing system assuming that no improvements are made by the design year.

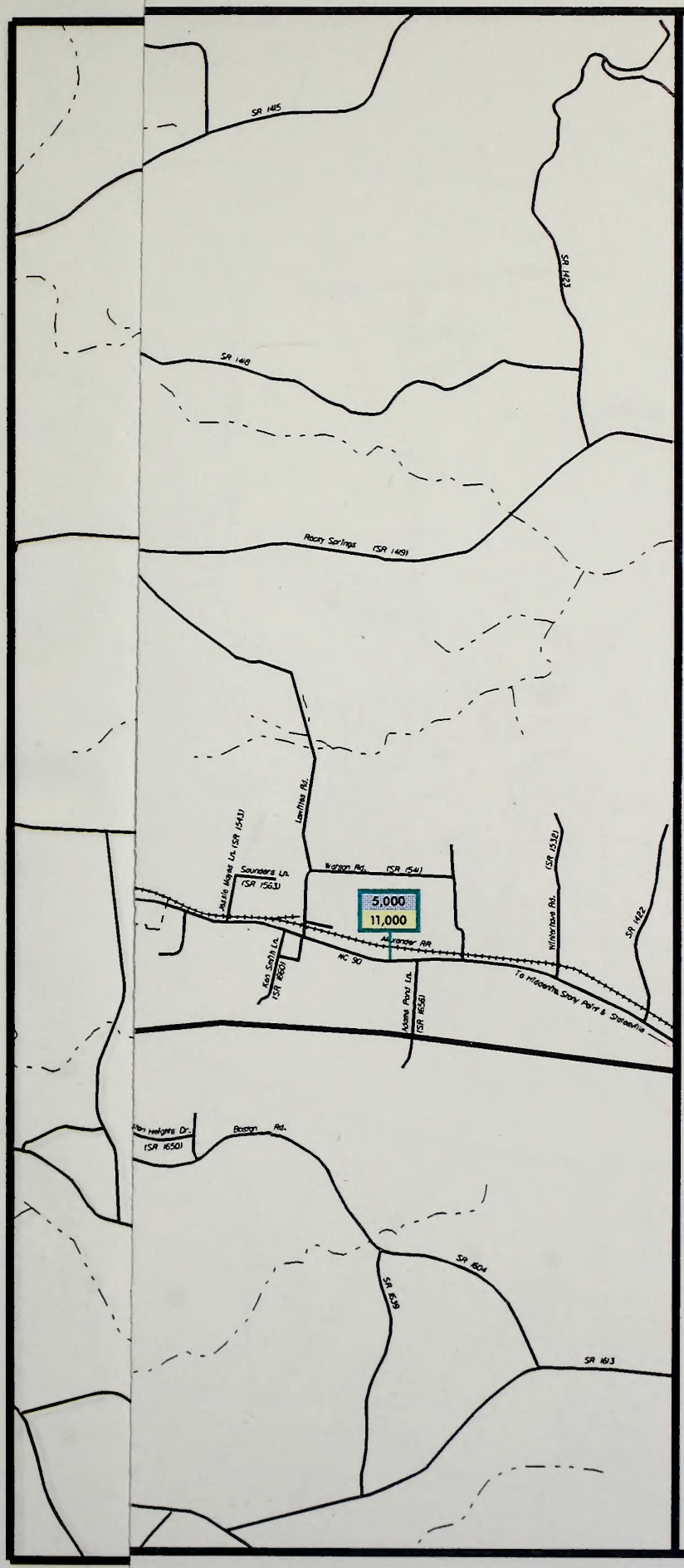


FIGURE 4

1994
TRAFFIC ON THE EXISTING SYSTEM
WITH NC 90 BYPASS

LEGEND

V/C 0.8 - 1.0
V/C > 1.0
NC 90 BYPASS

TRAFFIC 0,000
CAPACITY 0,000

TAYLORSVILLE

Alexander County

North Carolina

N

800 0 800 1600 2400
scale in feet

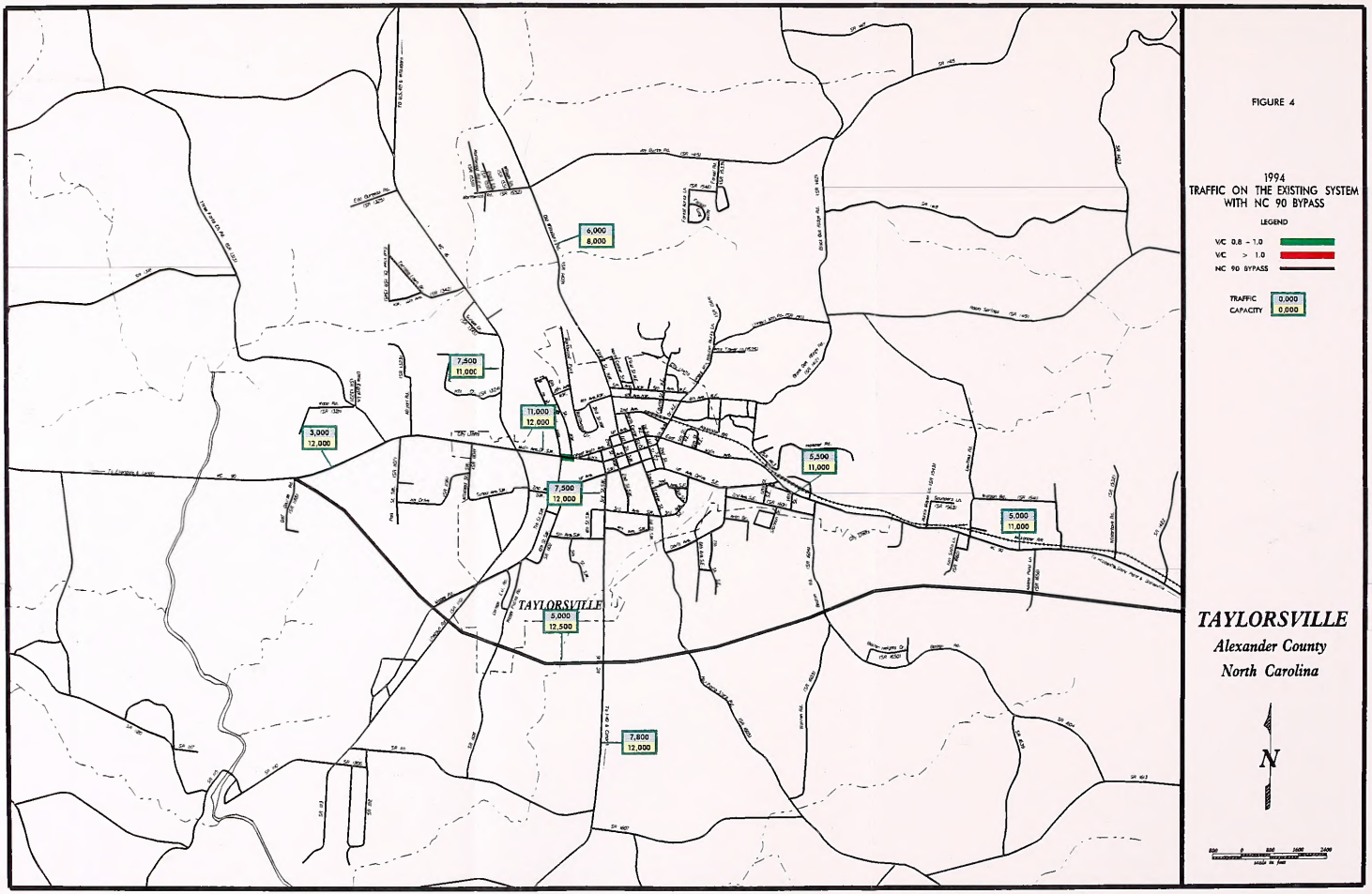


FIGURE 4

1994
TRAFFIC ON THE EXISTING SYSTEM
WITH NC 90 BYPASS

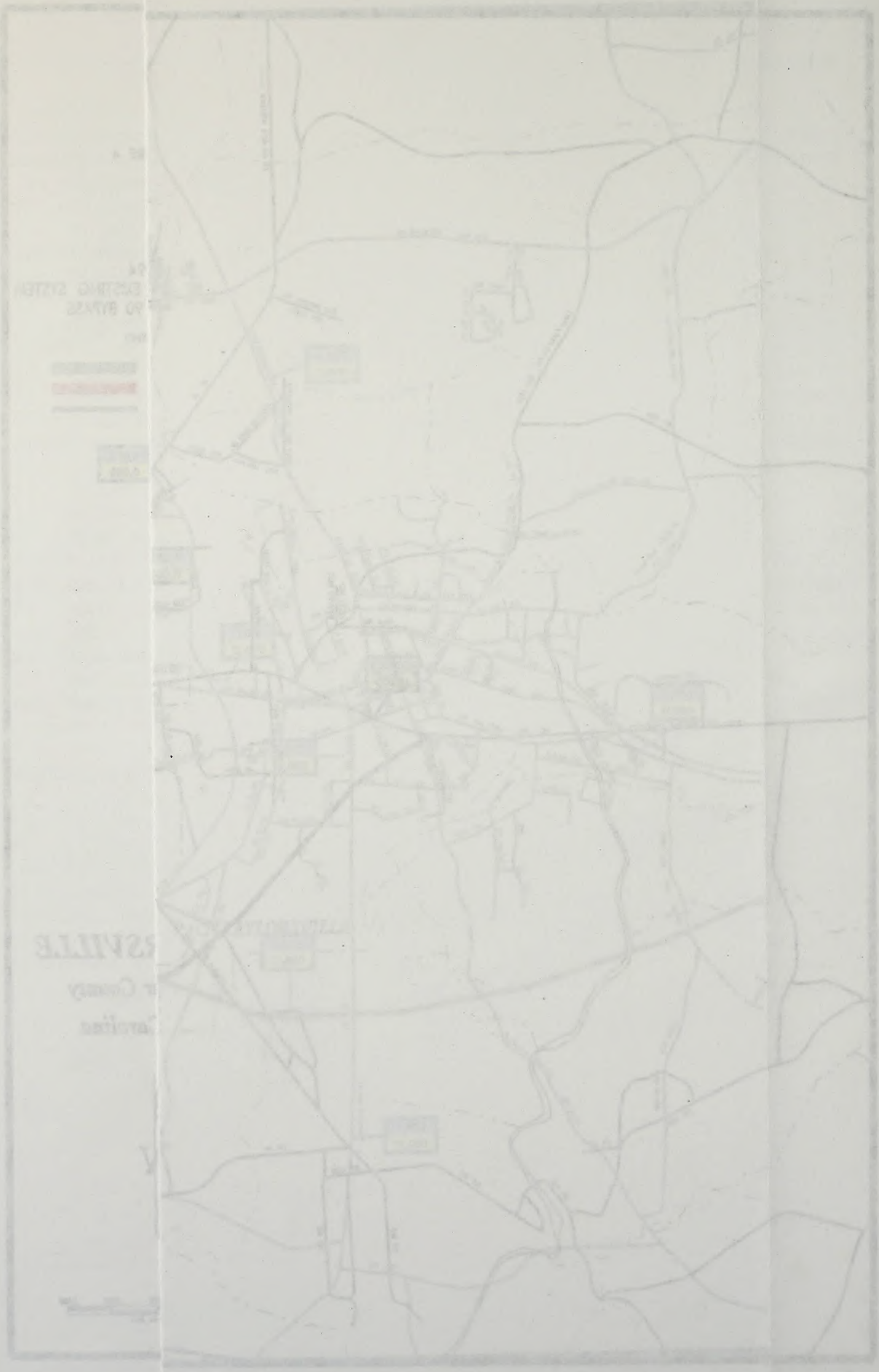
LEGEND

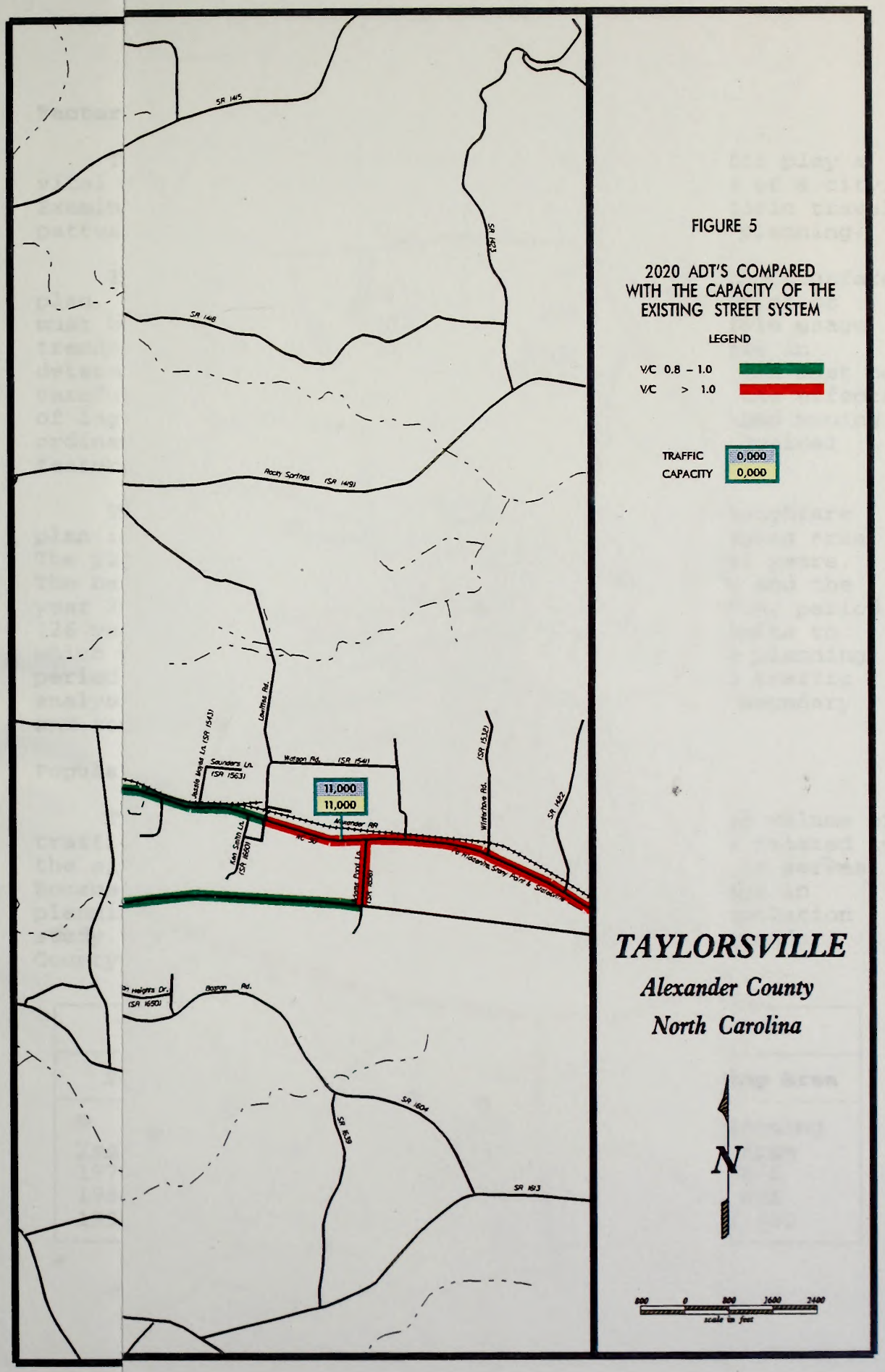
V/C 0.8 - 1.0
V/C > 1.0
NC 90 BYPASS

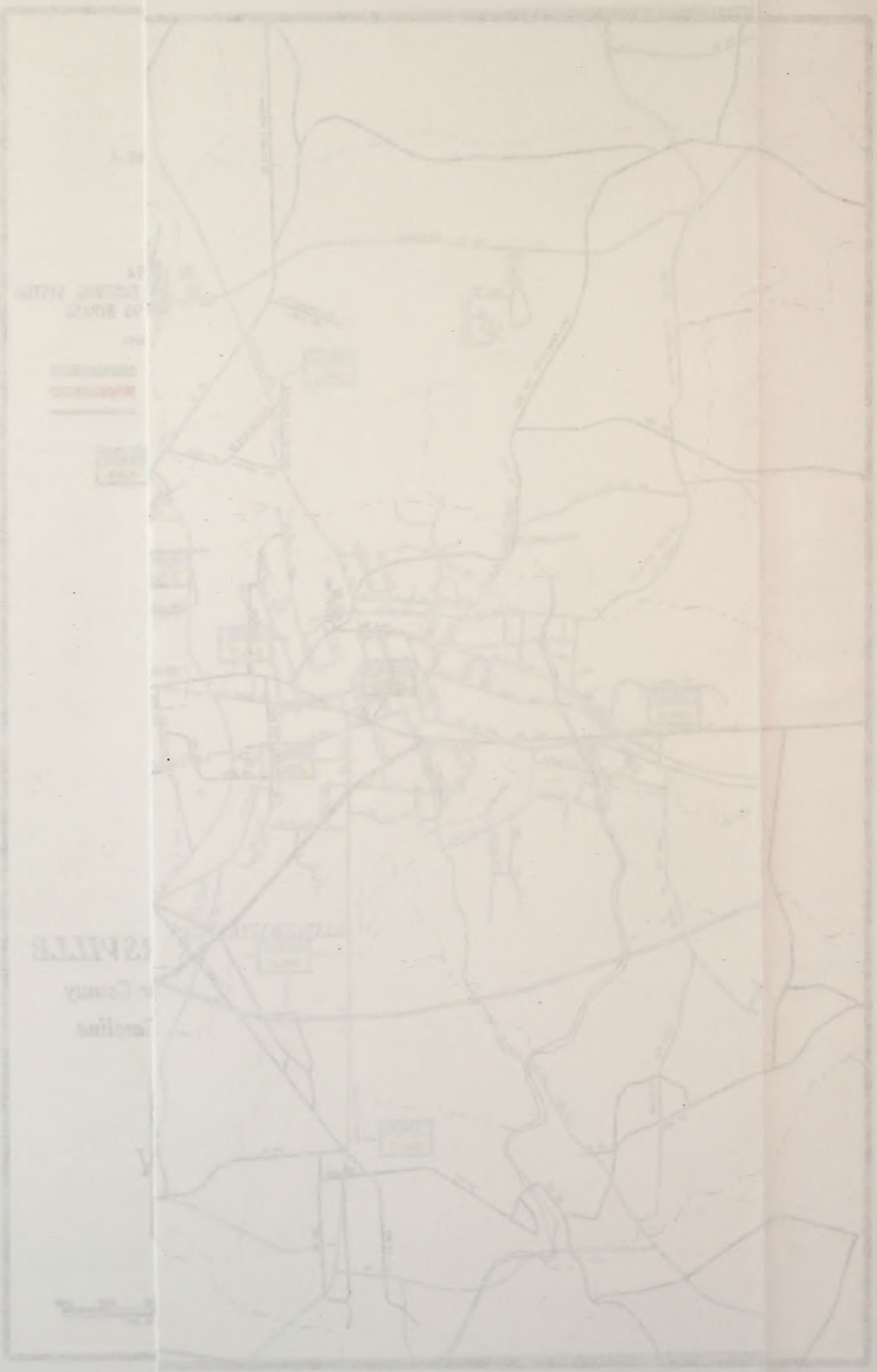
TRAFFIC 0,000
CAPACITY 0,000

TAYLORSVILLE
Alexander County
North Carolina

N




SR 1415
SR 1523
SR 1418
Rocky Springs (SR 1419)
Lowrance Rd.
Saunders Ln. (SR 1543)
Saunders Ln. (SR 1563)
Watson Rd. (SR 1541)
Winterrow Rd. (SR 1532)
SR 1422
11,000
11,000
Alexander RR
Ken Smith Ln. (SR 1600)
NC 90
Stone Pond Ln. (SR 1606)
To Hiddenite, Stony Point & Statesville
Boston Rd.
SR 1604
SR 1639
SR 1193
FIGURE 5
2020 ADT'S COMPARED WITH THE CAPACITY OF THE EXISTING STREET SYSTEM
LEGEND
V/C 0.8 – 1.0
V/C > 1.0
TRAFFIC 0,000
CAPACITY 0,000
TAYLORSVILLE
Alexander County
North Carolina
N
800 0 800 1600 2400
scale in feet



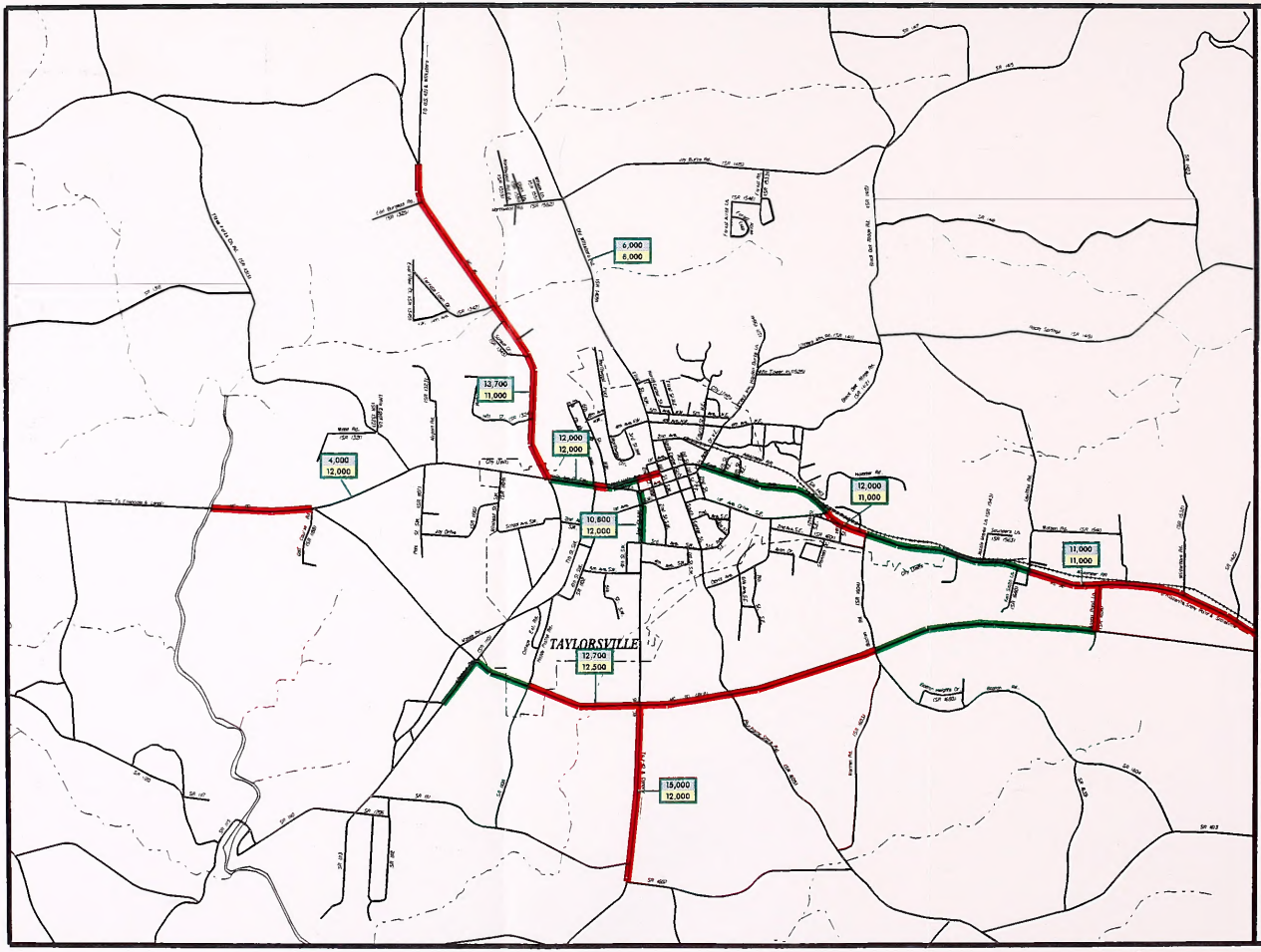


FIGURE 5

2020 ADT'S COMPARED WITH THE CAPACITY OF THE EXISTING STREET SYSTEM

LEGEND

V/C 0.8 – 1.0

V/C > 1.0

TRAFFIC 0,000
CAPACITY 0,000

TAYLORSVILLE

Alexander County

North Carolina

N

V. Population, Land Use, and Traffic

Factors Affecting Transportation

The factors of population, land use and traffic play a vital role in determining the transportation needs of a city. Examination of these factors helps to explain historic travel patterns and lays the groundwork for thoroughfare planning.

In order to formulate an adequate year 2020 thoroughfare plan, reliable forecasts of future travel characteristics must be achieved. The factors of population, vehicle usage trends, economy and land use play a significant role in determining the transportation needs of the area, and must be carefully analyzed. Additional items may include the effects of legal controls such as subdivision regulations and zoning ordinances, availability of public utilities and physical features of the area.

The first step in the development of the thoroughfare plan is to define the planning period and the planning area. The planning period is typically on the order of 25 years. The base year for the Taylorsville study was 1994, and the year 2020 was chosen to be the end point of the study period (26 years). The planning area is generally the limits to which urbanization is expected to occur during the planning period. The planning area is then subdivided into traffic analysis zones. Figure 6 shows the planning area boundary and zones.

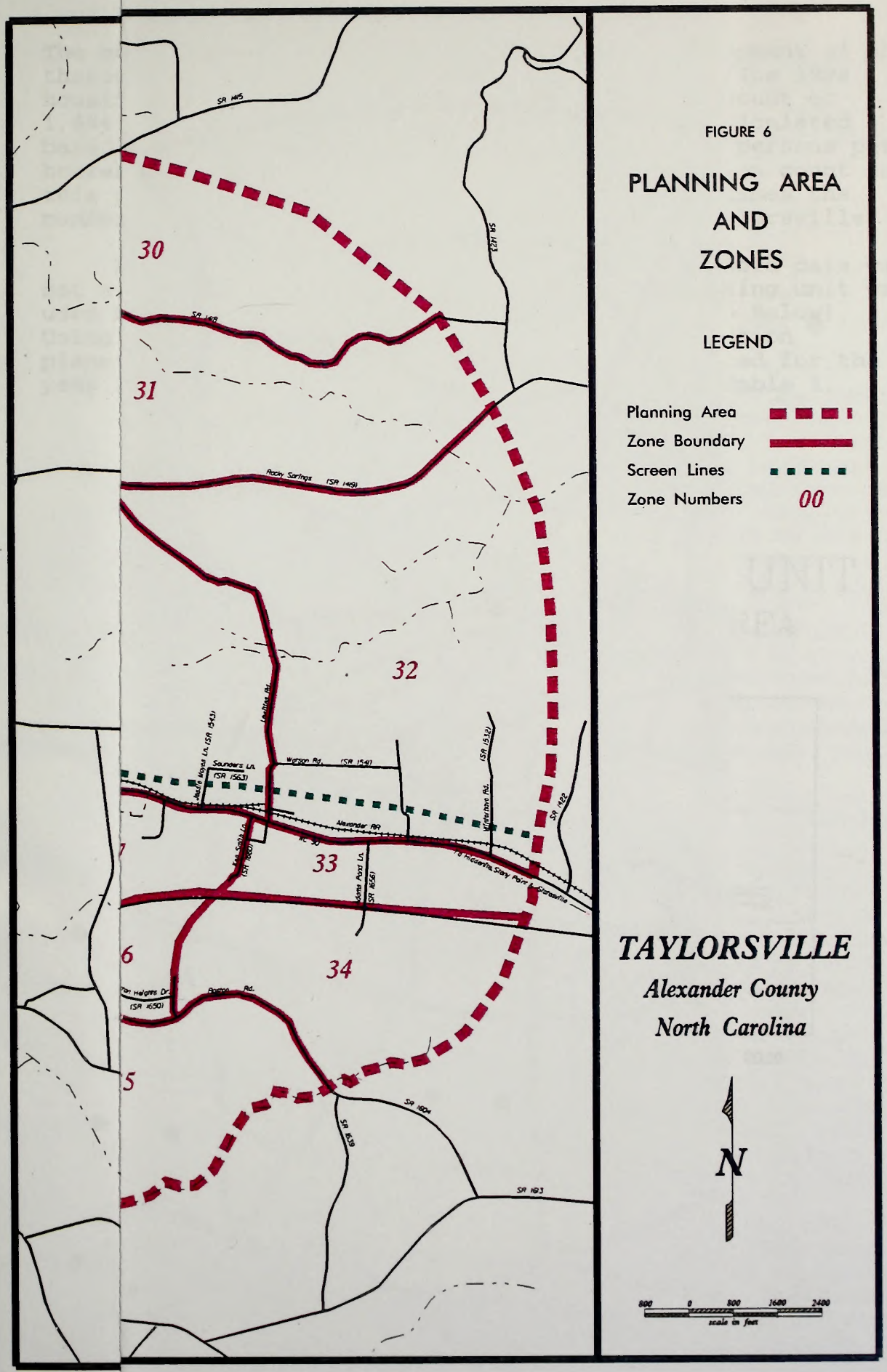
Population

Travel is directly related to population. The volume of traffic on any given section of roadway is closely related to the size and distribution of the population which it serves. Because of this relationship, one of the basic steps in planning a transportation system is an in-depth population study. Population trends for Taylorsville and Alexander County are shown in Table 7.

TABLE 7

Population Trends for the Taylorsville Planning Area

Year	Taylorsville	Alexander County	Planning Area
1970	1,231	19,466	N/A
1980	1,103	24,999	N/A
1990	1,566	27,544	4,800


SR 1415
30
SR 1418
31
Rocky Springs (SR 1419)
32
Saunders Ln. (SR 1563)
Watson Rd. (SR 1541)
Alexander RR
NC 90
33
Adams Post Ln. (SR 1558)
6
34
Brown Rd.
5
SR 1404
SR 1403
FIGURE 6
PLANNING AREA AND ZONES
LEGEND
Planning Area
Zone Boundary
Screen Lines
Zone Numbers 00
TAYLORSVILLE
Alexander County
North Carolina
N
800 0 800 1600 2400
scale in feet

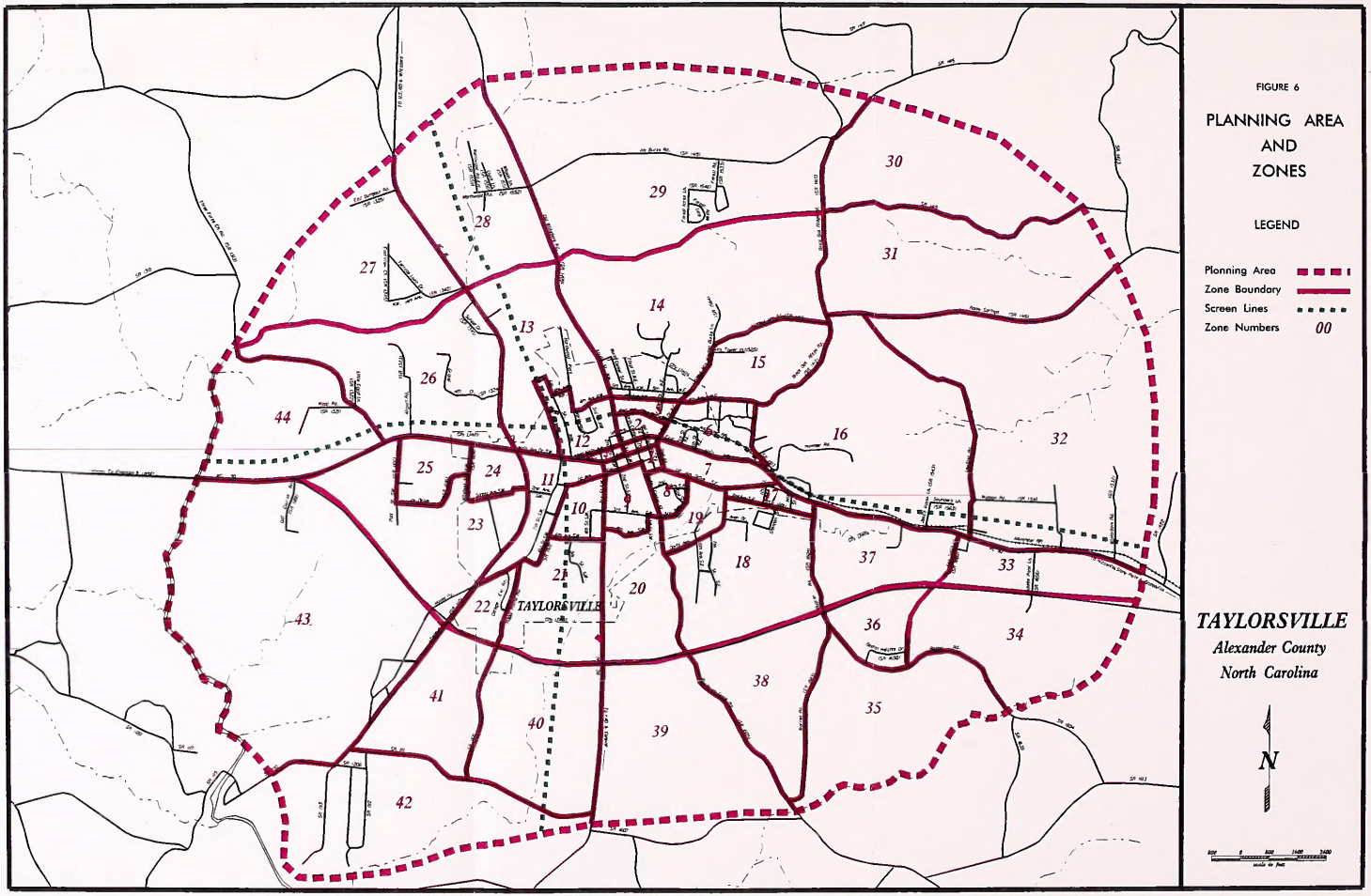


FIGURE 6
PLANNING AREA AND ZONES
LEGEND
Planning Area
Zone Boundary
Screen Lines
Zone Numbers 00
TAYLORSVILLE
Alexander County
North Carolina
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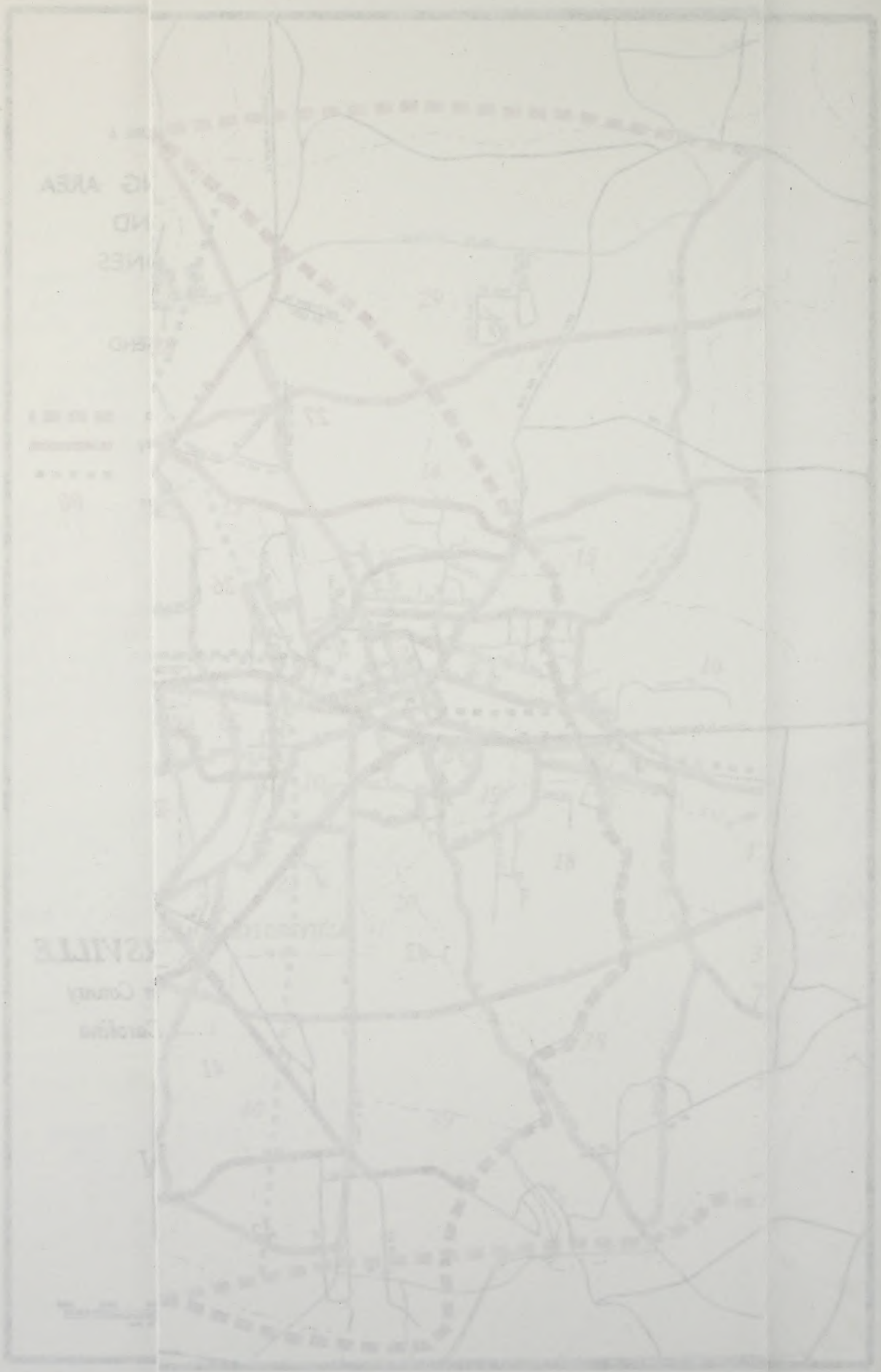


The most important population estimate for development of the thoroughfare plan is that of the planning area. The 1994 housing survey for this study area gave a final count of 1,884 units. The population for this area was calculated based on overall statistical trends of estimated persons per household. Therefore, the most accurate population count for this planning area multiplies the housing count times the number of persons per household estimated for Taylorsville.

At the time of this study persons per household data was not available for 1990, but 2.5 persons per dwelling unit was used based on previous data and trends (See Graph Below). Using this figure for the Taylorsville transportation planning area, a population of 4,800 was calculated for the year 1994. Population projections are shown in Table 8.

PERSONS PER DWELLING UNIT
TRANSPORTATION PLANNING AREA

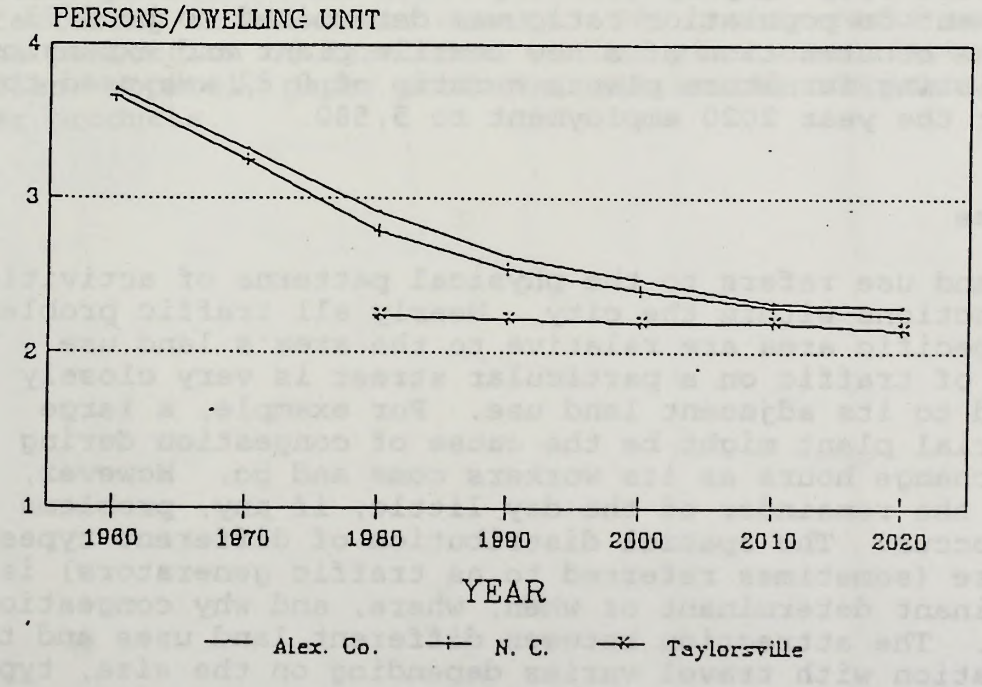


TABLE 8

Population Projections for the Taylorsville Planning Area

Year	Taylorsville	Alexander County	Planning Area
1990	1,566	27,544	4,800
2020	6,800	32,101	6,800

Economy and Employment

One of the most important factors to be considered in estimating the future traffic growth of an area is its economic base. The number of employers and the employee's income or purchasing power influences how much population can be supported in the area and the number of motor vehicles that will be locally owned and operated. Generally, as the family income increases so does the number of vehicles owned, as well as the number of vehicles trips generated per day by each household. An accurate projection of the future economy of the area is essential to estimating future travel demand.

Employment figures for Taylorsville show that in 1994 there were 3,487 employees. With this information the employment to population ratio was determined to be 0.73. With the construction of a new textile plant and expansion of two existing furniture plants a ratio of 0.82 was used to project the year 2020 employment to 5,580.

Land Use

Land use refers to the physical patterns of activities and functions within the city. Nearly all traffic problems in a specific area are relative to the area's land use. The amount of traffic on a particular street is very closely related to its adjacent land use. For example, a large industrial plant might be the cause of congestion during shift change hours as its workers come and go. However, during the remainder of the day little, if any, problems might occur. The spatial distribution of different types of land use (sometimes referred to as traffic generators) is the predominant determinant of when, where, and why congestion occurs. The attraction between different land uses and their association with travel varies depending on the size, type, intensity, and spatial seperation of each.

For use in transportation planning, land uses are grouped into four categories: (1) Residential - all land devoted to the housing of people with the exception of hotels and motels; (2) Commercial - all land devoted to retail trade including consumer and business services and offices;

(3) Industrial - all land devoted to manufacturing, storage, warehousing, and transportation of products; and (4) Public - all land devoted to social, religious, educational, cultural, and political activities. Figure 7 shows the planning area's existing land use.

Anticipated future land use is a logical extension of the present spatial distribution. Determination of where expected growth is to occur within the planning area facilitates the location of proposed thoroughfares. Areas of anticipated development and growth for Taylorsville area:

Residential - A large amount of Taylorsville's current residential land development is located on the northern sections of the town. With the new bypass ready to be opened for traffic soon there is a great potential for residential development along this corridor.

Commercial/Retail - All of the commercial development is located along the existing US 64. It is anticipated that this development will continue to spread along the NC 16 and US 64.

Industrial - The Town of Taylorsville has a large industrial development with the majority being textile and furniture plants. Over 7,200 persons are employed in manufacturing in Alexander County. The county ranks seventh in the production of furniture. Other plants manufacture textiles, apparel, paper products, electrical components and lumber products.

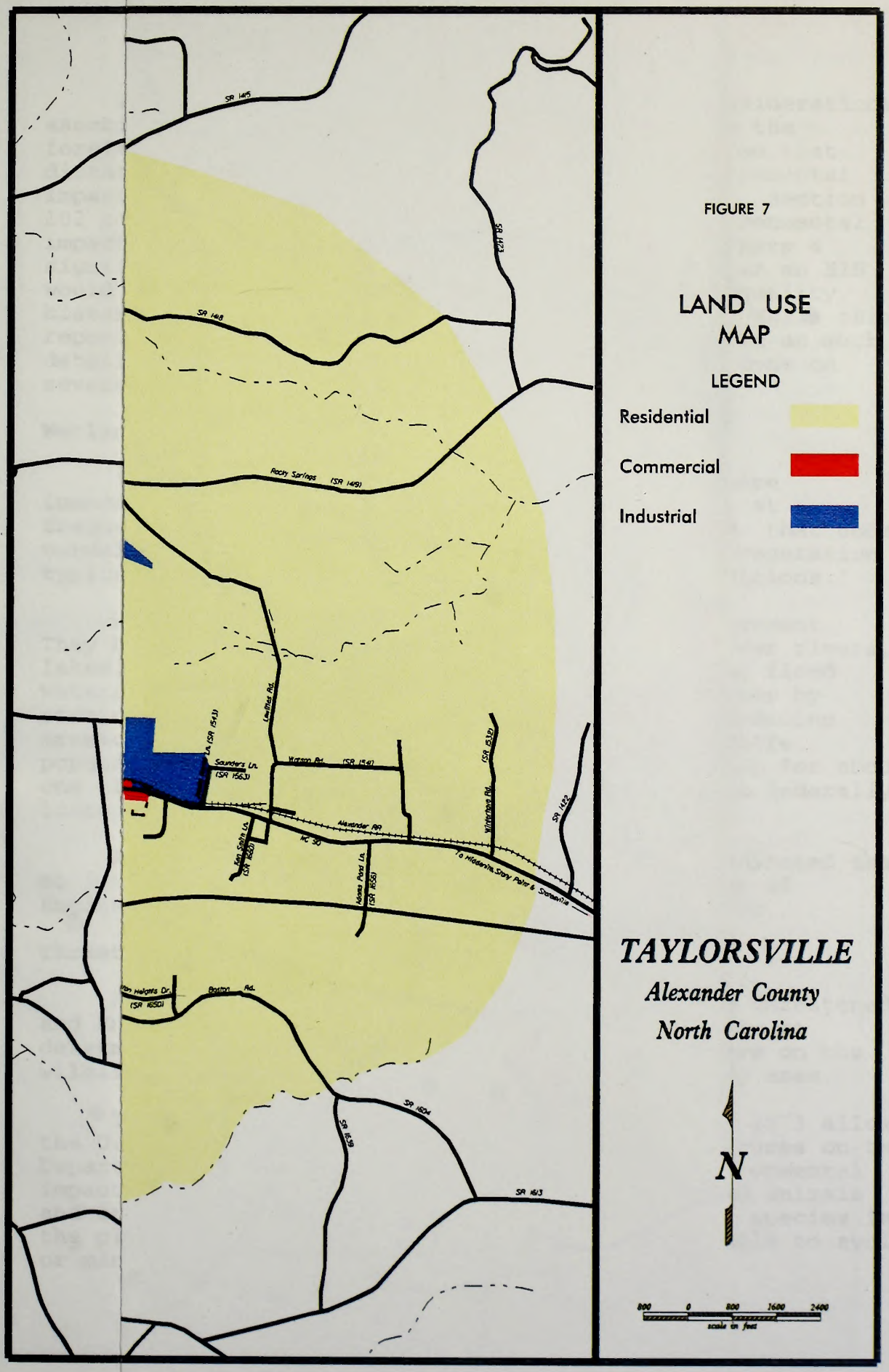


FIGURE 7

LAND USE MAP

LEGEND

Residential

Commercial

Industrial

TAYLORSVILLE

Alexander County

North Carolina

N

800 0 800 1600 2400

scale in feet

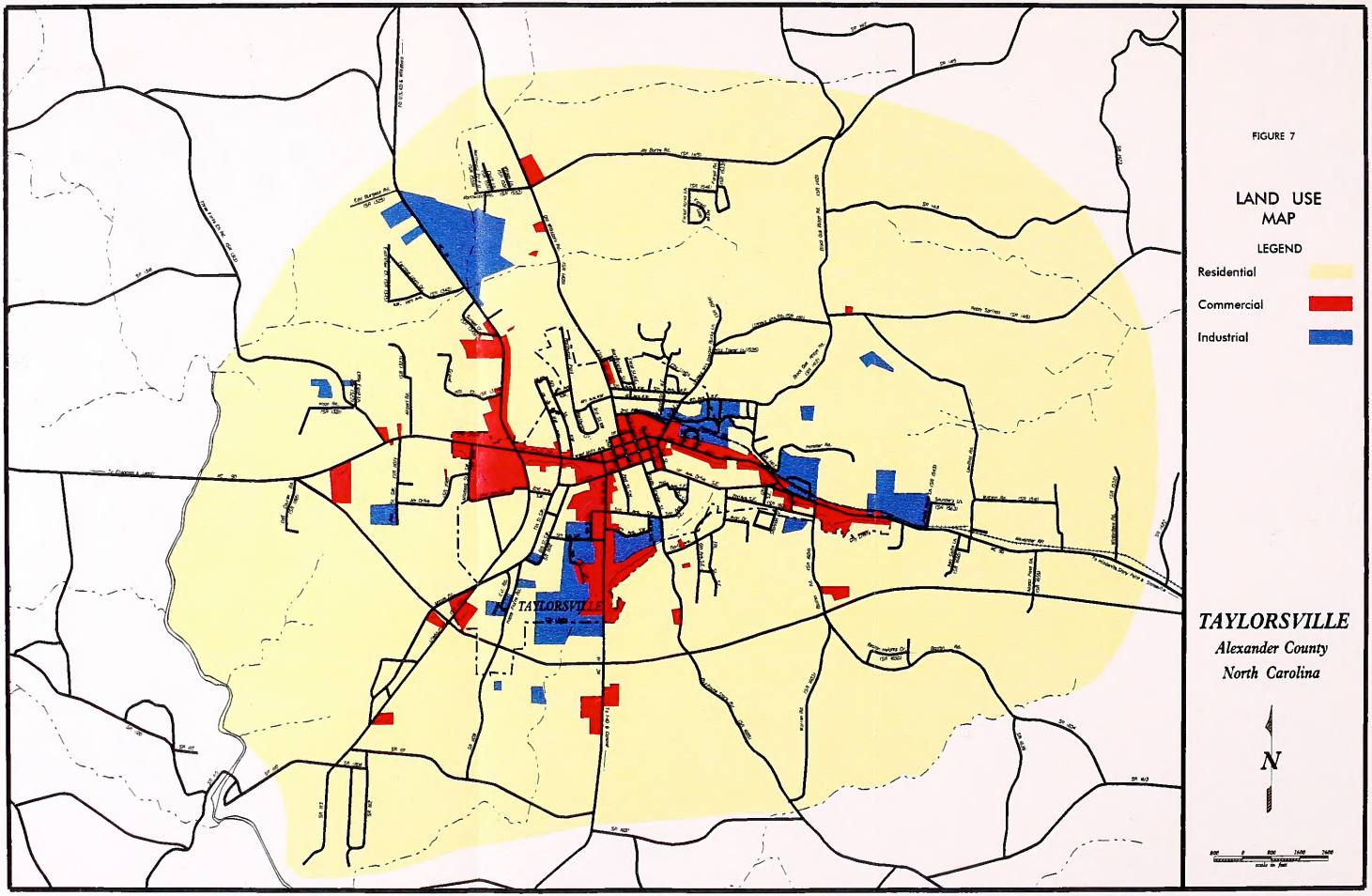


FIGURE 7

LAND USE MAP

LEGEND

Residential

Commercial

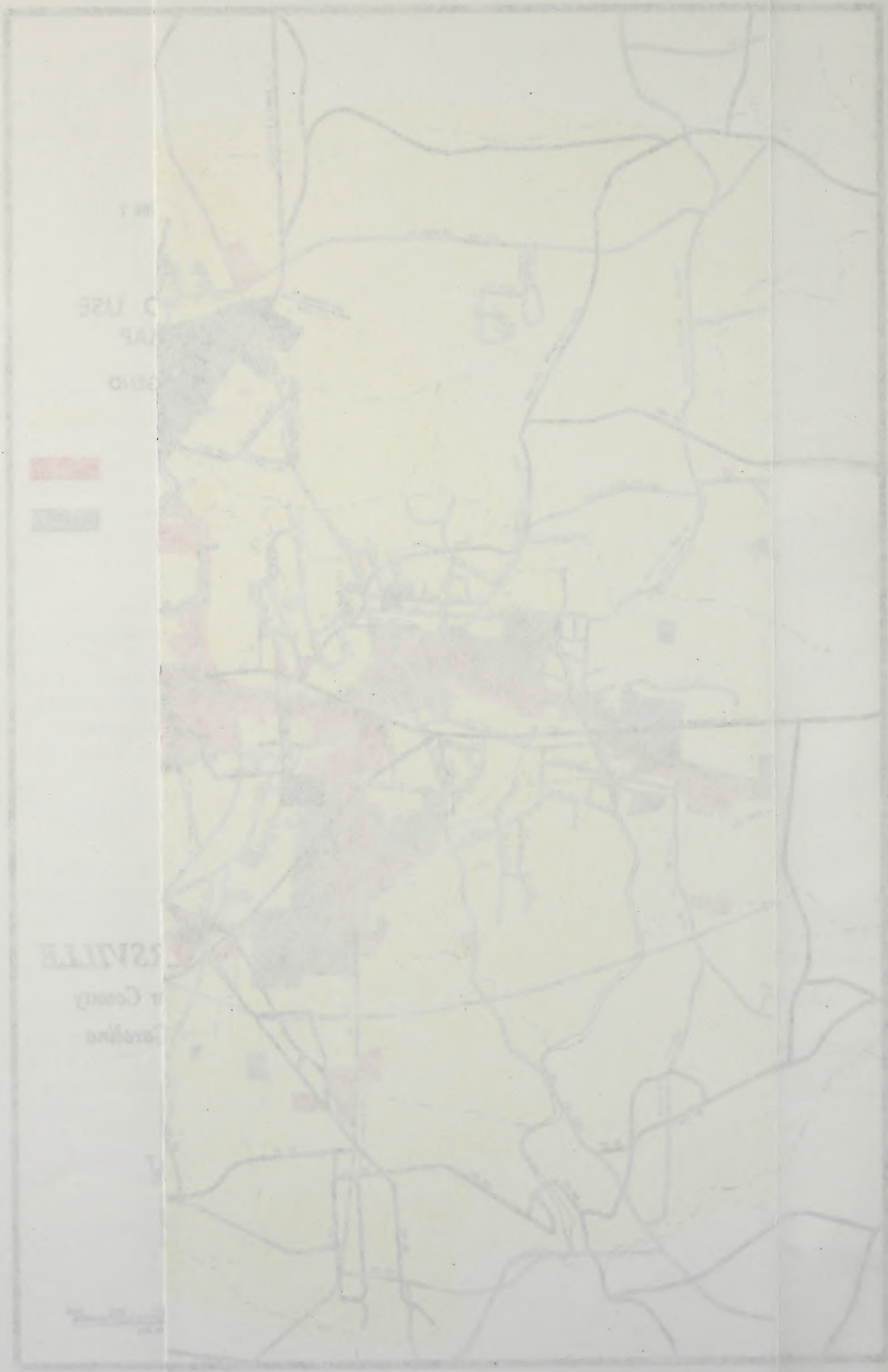
Industrial

TAYLORSVILLE

Alexander County

North Carolina

N



VI. Environmental Concerns

In the past several years, environmental considerations associated with highway construction have come to the forefront of the planning process. The legislation that dictates the necessary procedures regarding environmental impacts is the National Environmental Policy Act. Section 102 of this act requires the execution of an environmental impact statement, or EIS, for road projects that have a significant impact on the environment. Included in an EIS would be the project's impact on wetlands, water quality, historic properties, wildlife, and public lands. While this report does not cover the environmental concerns in as much detail as an EIS would, preliminary research was done on several of these factors and is included below.

Wetlands

"The term 'wetlands' means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and, that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Wetlands are crucial ecosystems in our environment. They help regulate and maintain the hydrology of our rivers, lakes, and streams by slowly storing and releasing flood waters. They help maintain the quality of our water by storing nutrients, reducing sediment loads, and reducing erosion. They are also critical to fish and wildlife populations. Wetlands provide an important habitat for about one third of the plant and animal species that are federally listed as threatened or endangered.

A survey by the staff biologist for NCDOT indicated that no jurisdictional wetlands meeting the above Corps of Engineers definition were found in the project area.

Threatened and Endangered Species

A preliminary review of the Federally Listed Threatened and Endangered Species within Taylorsville was done to determine the effects that new corridors could have on the wildlife. No species were identified in the study area.

The Threatened and Endangered Species Act of 1973 allows the U. S. Fish and Wildlife Service to impose measures on the Department of Transportation to mitigate the environmental impacts of a road project on endangered plants and animals and critical wildlife habitats. By locating rare species in the planning stage of road construction, we are able to avoid or minimize these impacts.

Historic and Archaeological Sites

The location of historic sites in Taylorsville was investigated to determine the possible impacts of the various projects studied. The federal government has issued guidelines requiring all State Transportation Departments to make special efforts to preserve historic sites. In addition, the State of North Carolina has issued its own guidelines for the preservation of historic sites. These two pieces of legislation are described below:

National Historic Preservation Act - Section 106 of this act requires the Department of Transportation to identify historic properties listed in the National Register of Historic Places and properties eligible to be listed. The DOT must consider the impact of its road projects on these properties and consult with Federal Advisory Council on Historic Preservation.

NC General Statute 121-12 (a) - This statute requires the DOT to identify historic properties listed on the National Register, but not necessarily those eligible to be listed. DOT must consider impacts and consult with the North Carolina Historical Commission, but it is not bound by their recommendations.

There are currently eleven properties in Taylorsville planning area that are currently listed on the National Register of Historic Places (See Figure 8). None of these properties will be affected by the projects proposed on the thoroughfare plan. However, care should be taken to make certain that all historic sites and natural settings are preserved. Therefore, a closer study should be done in regard to the local historic sites prior to the construction of any proposal.

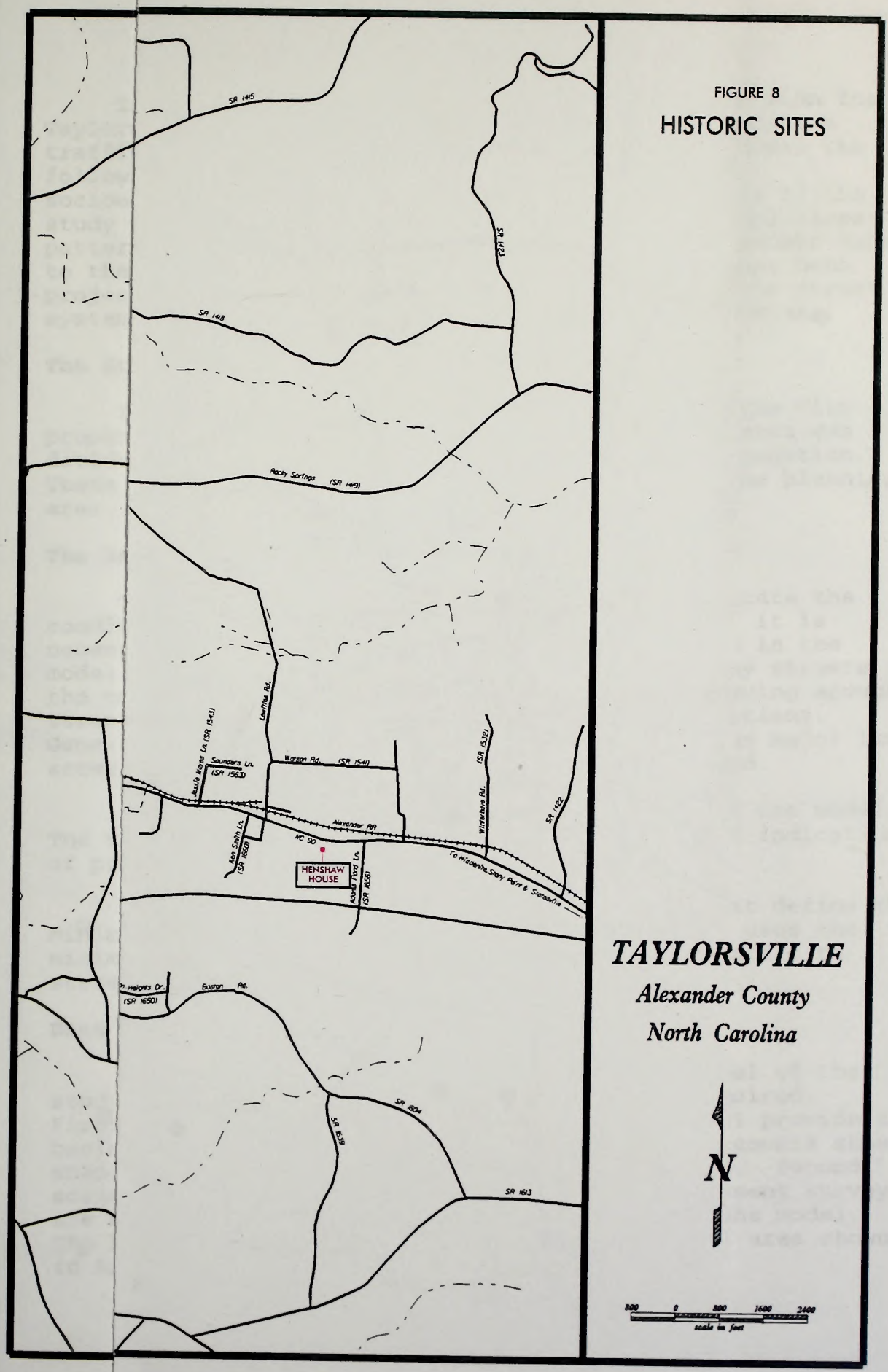


FIGURE 8

HISTORIC SITES

Historic and Archaeological Sites

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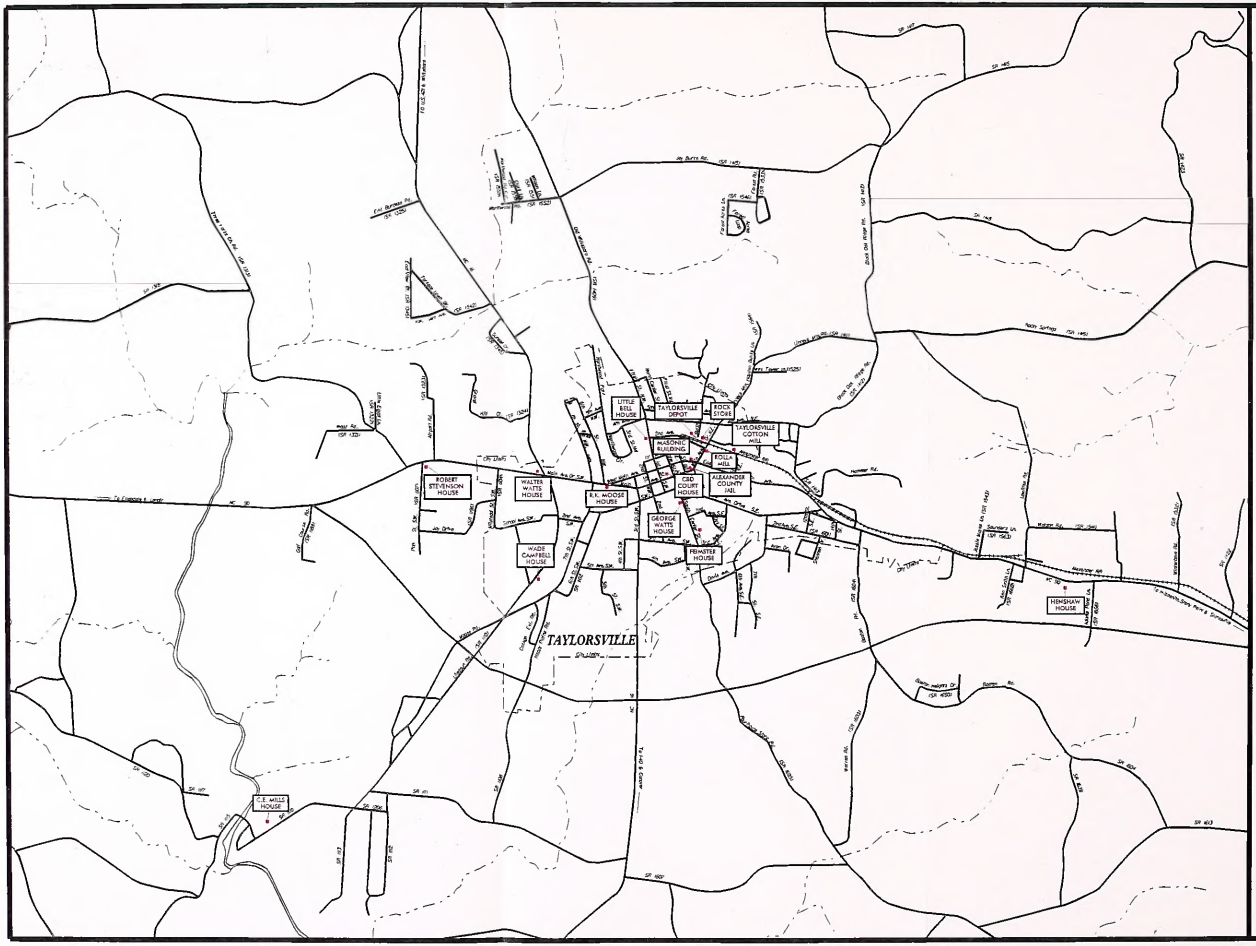


FIGURE 8

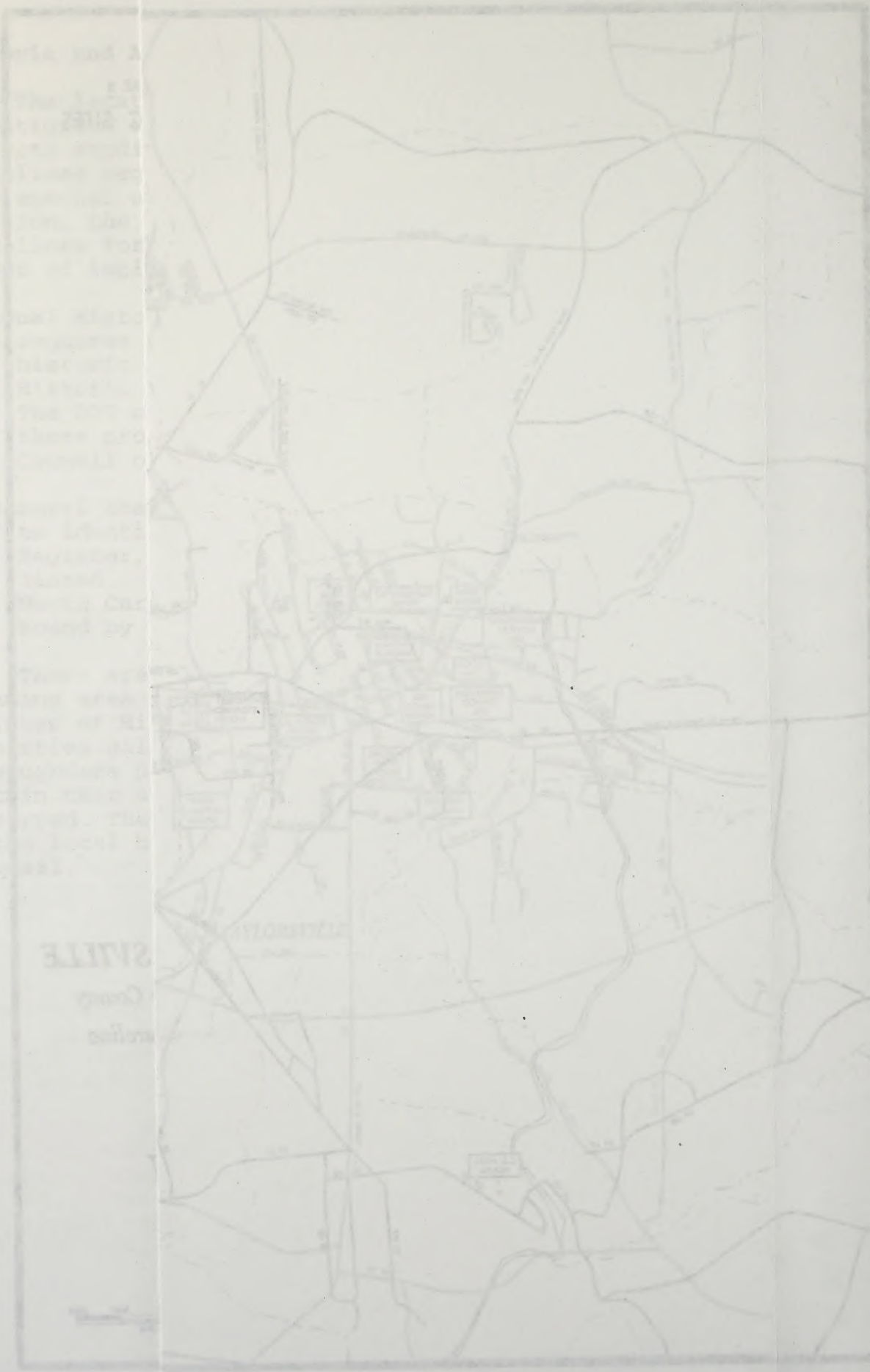
HISTORIC SITES

TAYLORSVILLE

Alexander County

North Carolina

N



VII. Traffic Model Development

In order to develop an efficient Thoroughfare Plan for Taylorsville it was necessary to develop and calibrate a traffic model of the City. To develop a traffic model the following information is required: traffic counts, socioeconomic data, trip generation characteristics of the study area, calibrated traffic model so that it duplicates patterns of the study area, and projected socioeconomic data to the design year. Once the socioeconomic data has been projected, the model may be used to evaluate various street system problems and alternate solutions to the problems.

The Study Area

The study area for Taylorsville consists of the City proper and some additional outlaying area. This area was divided into 44 zones for data collection and aggregation. These zones reflect similar land use throughout the planning area.

The Base Year Network

The purpose of the traffic model is to replicate the conditions on the city street system. Therefore, it is necessary to represent the existing street system in the model. There is a balance between having too many streets on the model to allow it to be calibrated and not having enough streets to realistically duplicate existing conditions. Generally, all the major arterials and some of the major land access or collector streets need to be represented.

Street capacity is an important component of the model. The volume/capacity ratio (v/c) gives us our best indication of present and future traffic congestion.

Speed and distance are the major factors that define the minimum time paths from zone to zone. The model uses the minimum time paths as the basis for assigning traffic to streets.

Data Requirements

In order to produce an adequate traffic model of the study area, two additional types of data are required. First, traffic counts on routes used in the model provide a basis for calibrating the model. These traffic counts show a snapshot of traffic conditions in the study area. Second, socioeconomic data (housing counts and an employment survey) are necessary in order to generate traffic for the model. The housing and socioeconomic data for the model area shown in Appendix A.

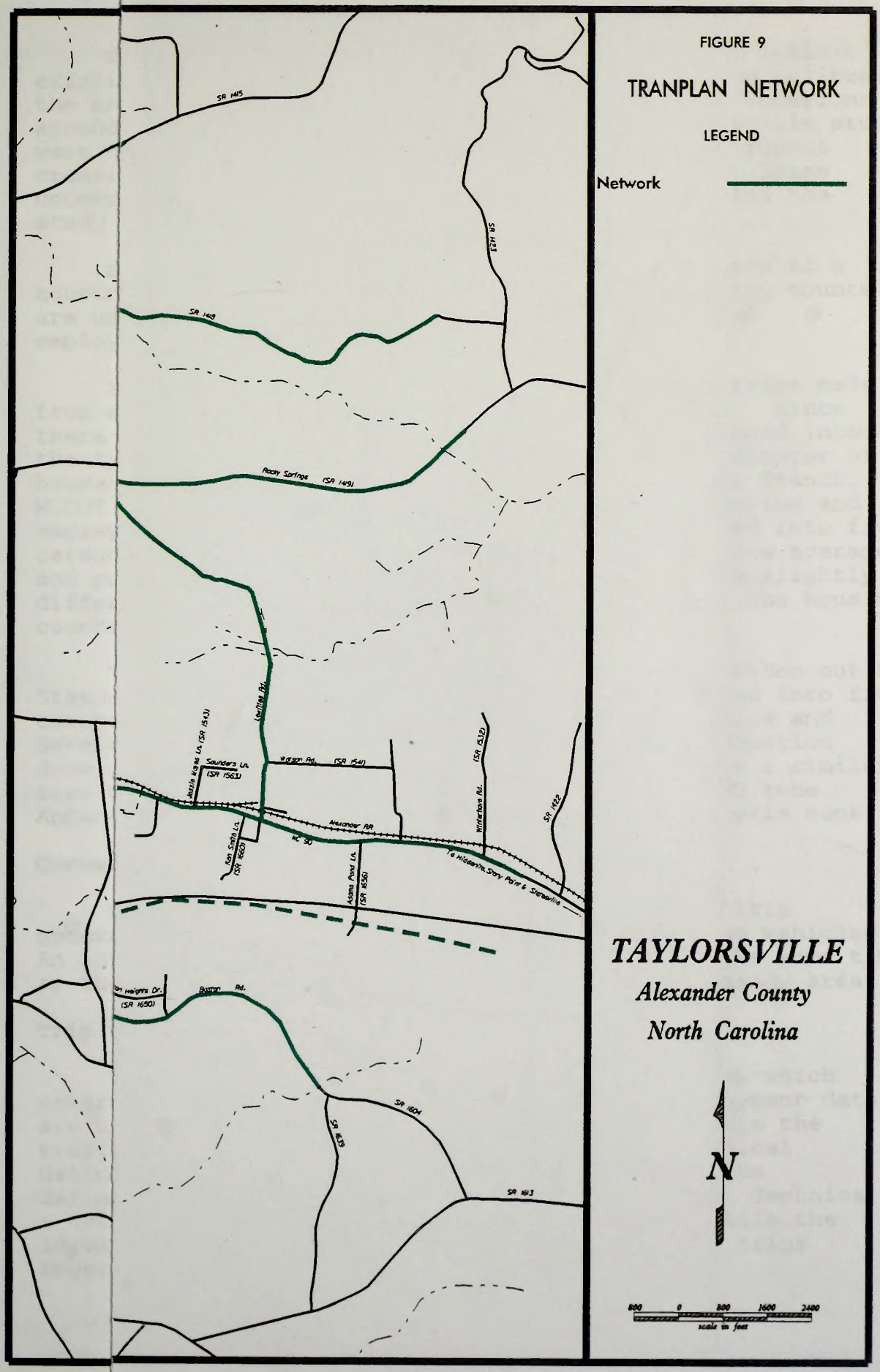


FIGURE 9

TRANPLAN NETWORK

LEGEND

Network

TAYLORSVILLE

Alexander County

North Carolina

N

800 0 800 1600 2400

scale in feet

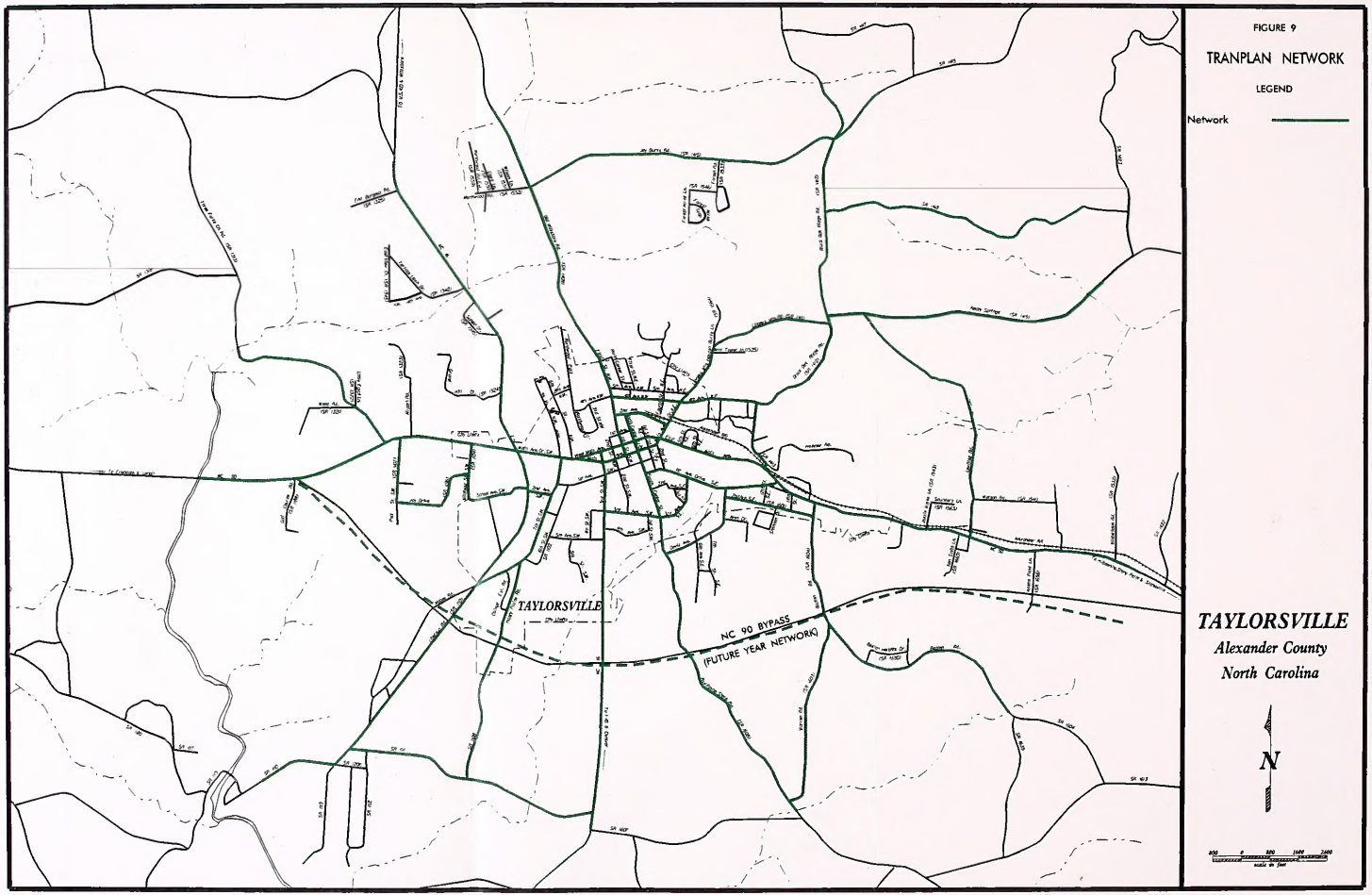


FIGURE 9

TRANPLAN NETWORK

LEGEND

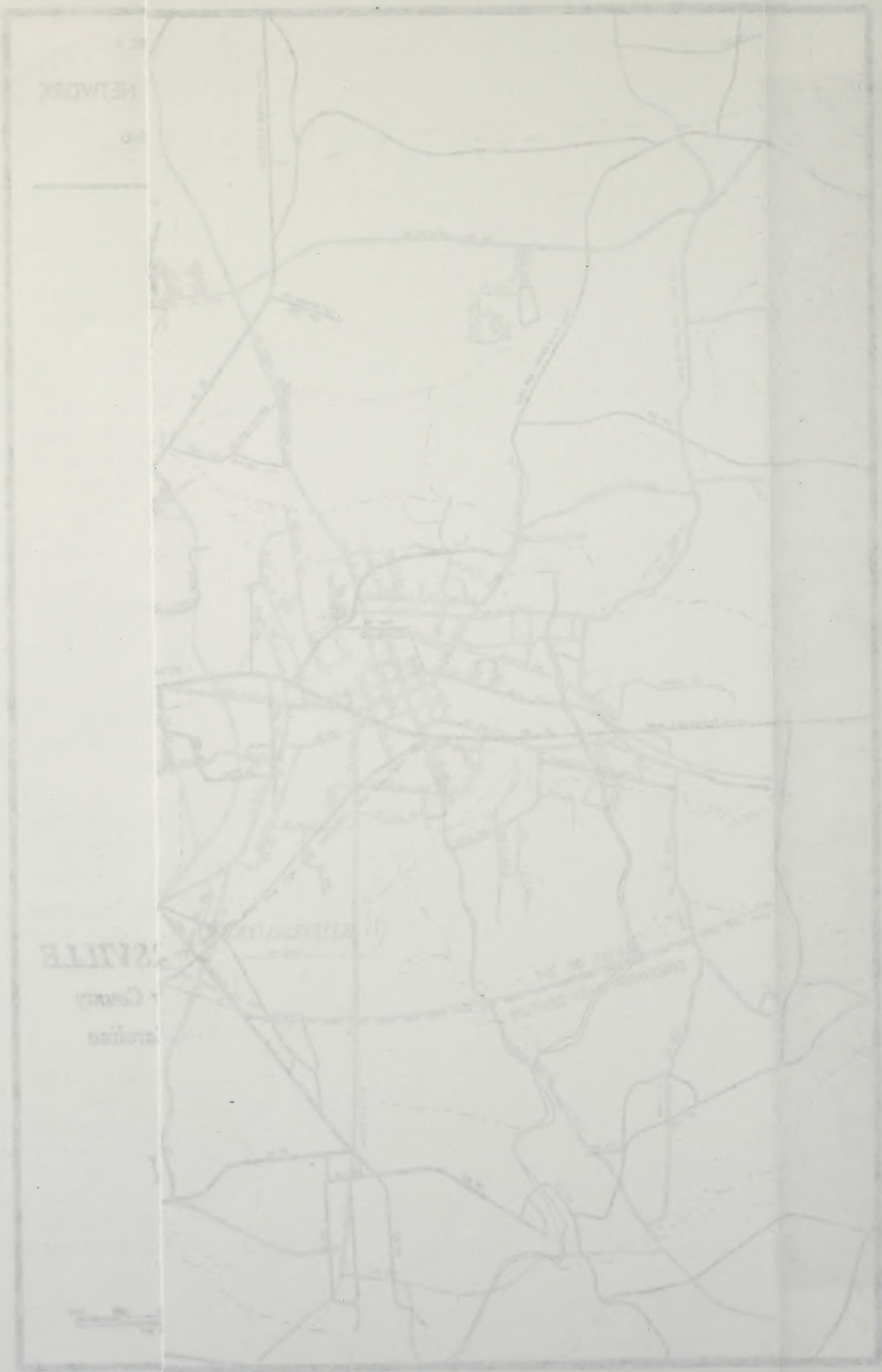
Network

TAYLORSVILLE

Alexander County

North Carolina

N



Traffic Counts - The model must be calibrated against existing conditions in the study area. In order to calibrate the model traffic counts must be taken at various locations around the study area. The counts for the Taylorsville study were collected during 1994. Also, volumes on all routes crossing the planning area boundary were counted. These counts show how much traffic is entering and exiting the study area.

Socioeconomic Data - The required data consists of a housing count and an employment survey. The housing counts are used in the model as the generator of trips and employment is used as the attractor of trips.

The best indicator of the average number of trips made from a household in a day is the household income. Since there is no adequate method for determining household income, the type and quality of housing was used as an indicator of household income. The staff at Statewide Planning Branch, NCDOT conducted a windshield survey to collect housing and employment data. The housing inventory was divided into five categories: excellent, above average, average, below average, and poor. Each of these categories was assigned a slightly different trip generation rate. Appendix A shows the housing counts for each traffic zone.

The employment data that was collected was broken out by Standard Industrial Code classification and grouped into five categories: Industry, Special Retail, Retail, Office and Services. This data was used with a regression equation developed from an origin and destination survey of a similar size city to produce an attraction factor for each zone. Appendix A shows total employment by traffic analysis zone.

Commercial Vehicles

Commercial vehicles have somewhat different trip generation characteristics than do privately owned vehicles. An inventory of commercial vehicles was done at the same time as the employment and housing inventory for the study area.

Trip Generation

The trip generation process is the process by which external station volumes, housing data, and employment data are used to generate traffic volumes that duplicate the traffic volumes on the street network. The technical definition of a trip is slightly different than the definition of a trip used by the general public. Technically a trip only has one origin and one destination while the layman will often group, or chain, several short trips together as one longer trip.

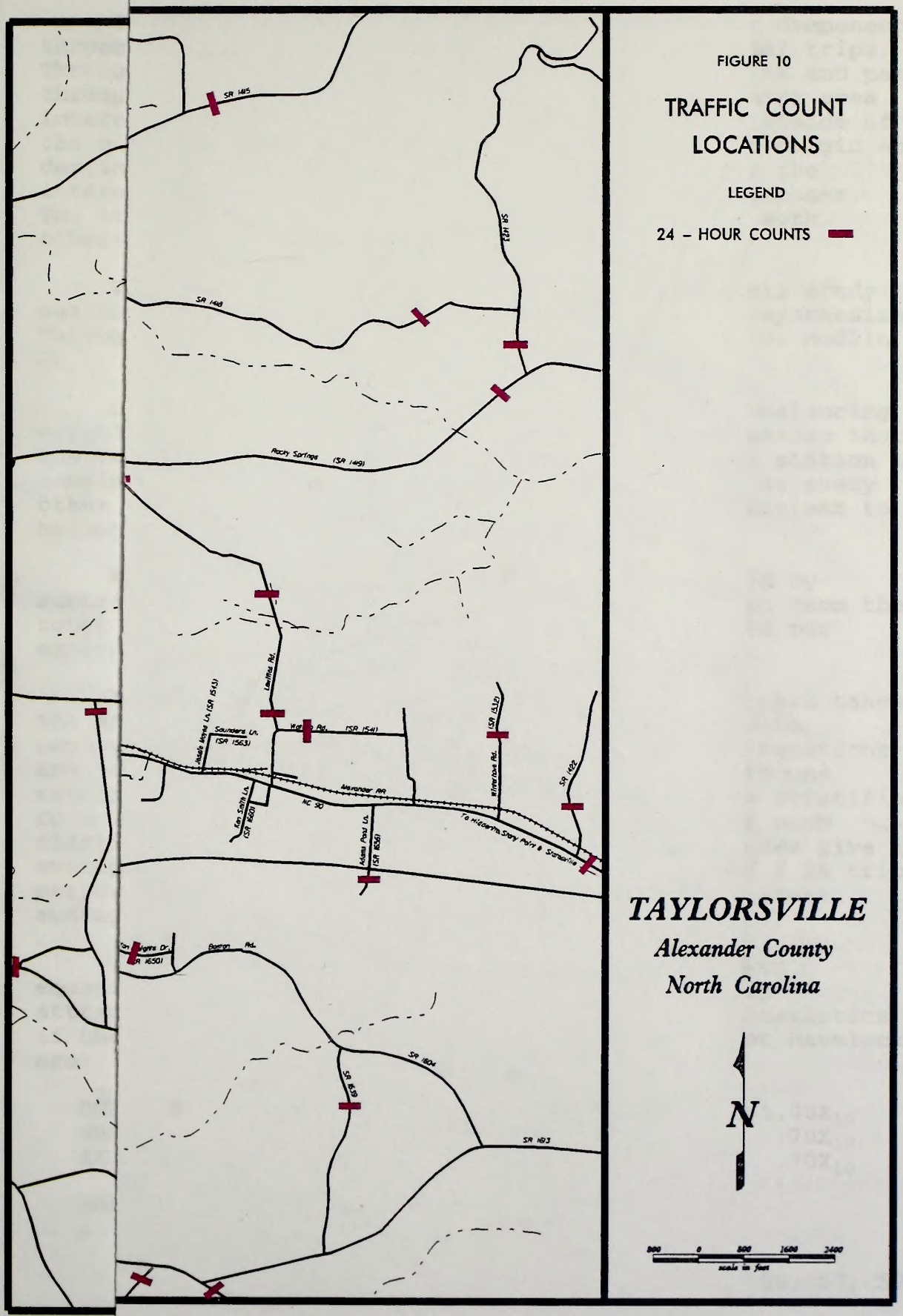


FIGURE 10

TRAFFIC COUNT LOCATIONS

LEGEND

24 – HOUR COUNTS

TAYLORSVILLE

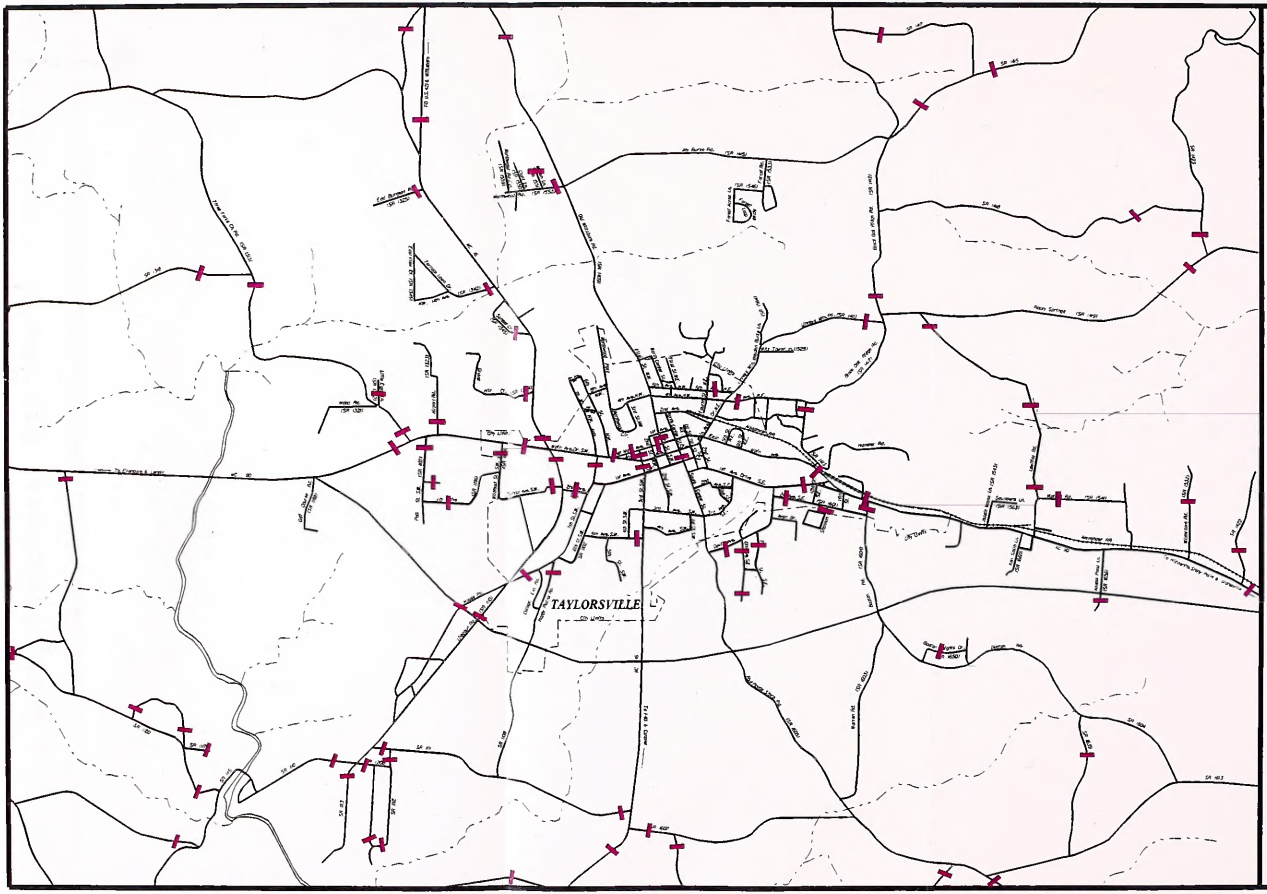
Alexander County

North Carolina

N

800 0 800 1600 2400

scale in feet



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TRAFFIC COUNT LOCATIONS

LEGEND

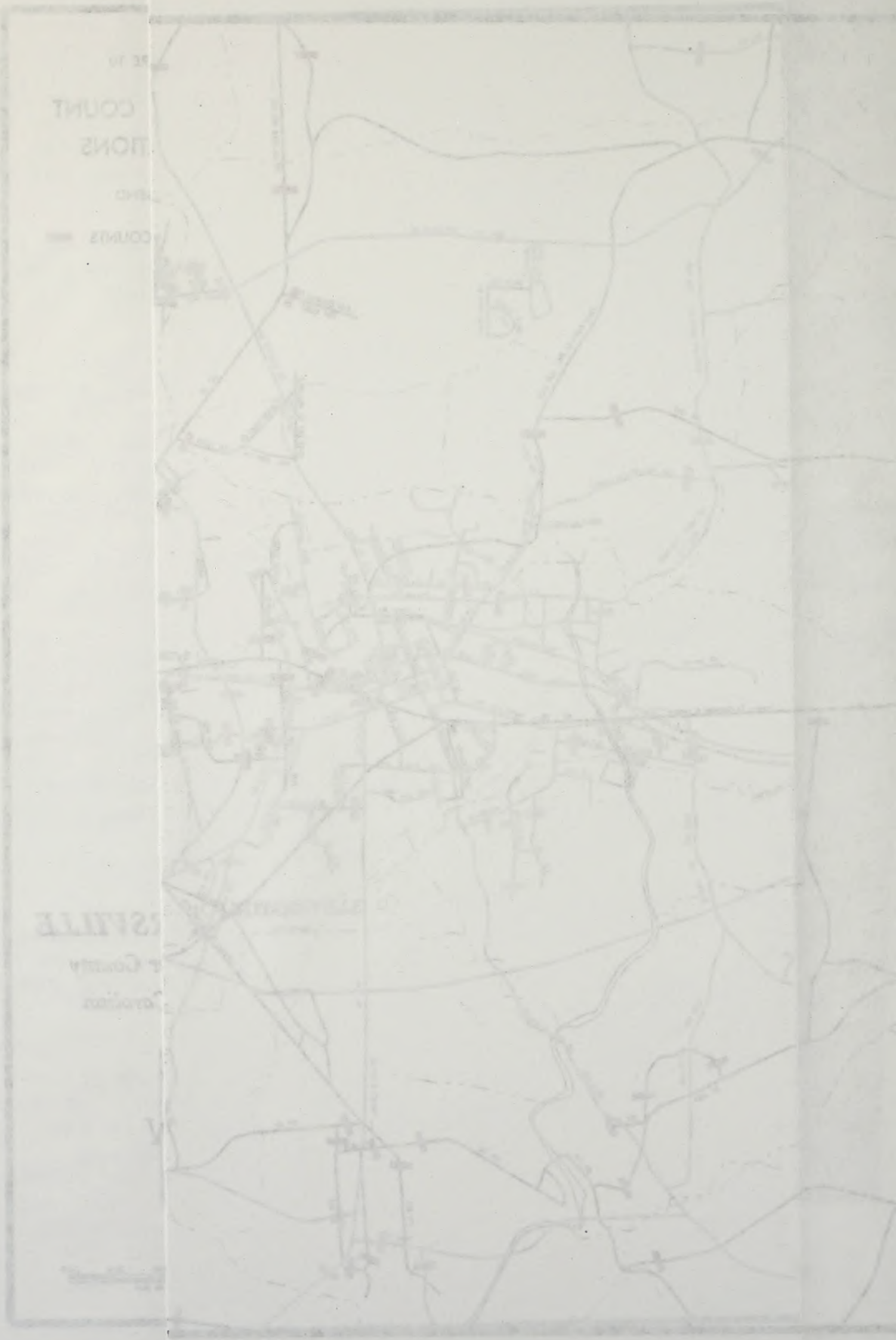
24 – HOUR COUNTS

TAYLORSVILLE

Alexander County

North Carolina

N



Traffic inside the study area has three major components through trips, internal-external trips, and internal trips. Through trips are produced outside the planning area and pass through enroute to a destination outside the planning area. Internal-external trips have one end of the trip outside of the planning area. Internal trips have both their origin and destination inside the planning area. For clarity the internal trips are further subdivided into trip purposes. The trip purposes for Taylorsville are home-based work, other-home based, and non-home based.

Through Trips - The Through Trip Table for this study was developed based on Technical Report Number 3 (Synthesized Through Trip Table for Small Urban Areas by David G. Modlin, Jr.).

Once these volumes were developed the fratar balancing method was then used to balance the trip percentages so that the total number of through trips at each external station is consistent with the total number of through trips at every other station. Generally five iterations are sufficient to balance the error between external zones.

External - internal trip volume was determined by subtracting the through trip volume at each station from the total traffic volume at that station. See Table 12 for external - internal and through trip values.

Internal Data Summary - (IDS) is the process that takes the external - internal traffic volumes, housing data, employment data, generation rates, and regression equations and generates the trip productions and trip attractions required by the gravity model. Housing units were stratified to account for differing trip generation rates for each classification. The individual trip generation rates give an average trip generation rate for the study area of 8.26 trips per dwelling unit (du). This is in line with the state average of 7 to 8 trips per dwelling unit.

Trip attractions were produced using regression equations. The regression equations considers trip attractions to be related to the employment characteristics of the traffic zones. The regression equations for Havelock are:

$$\text{OHB} \quad Y = .10X_1 + 2.0X_2 + 8.4X_3 + 2.6X_4 + 2.5X_5 + 1.00X_{10}$$
$$\text{NHB} \quad Y = .20X_1 + 2.0X_2 + 8.4X_3 + 2.6X_4 + 2.5X_5 + .70X_{10}$$
$$\text{EXT} \quad Y = .50X_1 + 2.0X_2 + 8.4X_3 + 2.6X_4 + 2.5X_5 + .70X_{10}$$

WHERE: Y = Attraction factor for each zone
X1 = Industry (SIC codes 1-49)
X2 = Retail (SIC codes 55, 58)
X3 = Special Retail (SIC codes 50-54, 56, 57, 59)

X4 = Office (SIC codes 60-67, 91-97)
X5 = Services (SIC codes 70-76, 78-89, 99)
X10 = Attraction caused by housing (N/A)

The output of the IDS program are trip productions and trip attractions for each zone divided into four trip purposes. Home-based work, Non-home based and external-internal. The trips area segregated into trip purposes because different trip lengths are associated with each trip purpose.

Internal Trip Distribution

Once the number of trips per traffic zone is determined, the trips must still be distributed to other traffic zones. The preferred method of distributed internal and external-internal trips, called the 'Gravity Model', states that the number of trips between Zone A multiplied by the number of trips attracted to Zone B multiplied by a travel time factor. The gravity model takes the form:

$$T_{ij} = \frac{P_i \times A_j \times F_{ij}}{\text{Sum } x=1,\ n \text{ of } A_x F_{t'x}}$$

T_{ij} = The number of trips produced n zone i and attracted to zone J.
P_i = The number of trips produced in zone i.
A_j = The number of trips attracted to zone j.
F_{ij} = The travel time factor.
n = The total number of zones.
i = The origin zone number.
j = The destination zone number.
x = Any zone number.

The travel time factor or friction factor (F) is critical to the gravity model distribution and must be derived empirically. The friction factor is dependent on the distance between the traffic zones and the time necessary to travel these distances. This factor is also dependent on the trip purpose. In order to derive this factor a gravity model calibration program is run with an initial friction factor and trip length frequency curve for each trip purpose. The initial friction factors used in the Taylorsville model were 100 for all trip purposes and time increments. Table 13 shows the actual values used for the friction factors and trip length frequency curves.

Model Calibration

The purpose of a traffic model is to predict the traffic on a street system at some future point in time; however, if the model is not accurate, it is useless for this purpose. Therefore the model must duplicate the existing traffic

pattern. The actual calibration of the model is an iterative process in which incremental changes area made either in the trip generation, trip distribution, or the street network. The purpose of each change is to allow the model to more accurately reflect the real world conditions upon which it is based. Only when the model can adequately reflect the existing traffic pattern should it be used to predict traffic in the future.

Accuracy Checks

There are three checks made on the model. The first is to follow trips through all the steps involved in the model. The purpose of this check is to insure that no trips have been accidentally added to or subtracted from the model, and that no trips have been counted twice. The second check is to compare the model generated trips on the screenlines. A model is considered to accurately reflect the overall patterns if the trips it generates are from 95% to 105% of the ground counts on the screenlines. Table 9 compares the ground counts with the model traffic volumes on the screenlines. See figure 6 for screenline location.

TABLE 9

Actual vs. Modeled Screenline Totals

Screenline	Ground Count	Model Volume	Percent
A EW	14900	14596	98%
B NS	15043	16403	109%

The final check for the model is to match the traffic volumes on the links in the model with the ADT at the same location. The 'link counts' can be used to find particular places in the network where there are problems. Comparing the link counts with the ground counts for those links did not reveal any problems with the model.

Data Projections to the Design Year

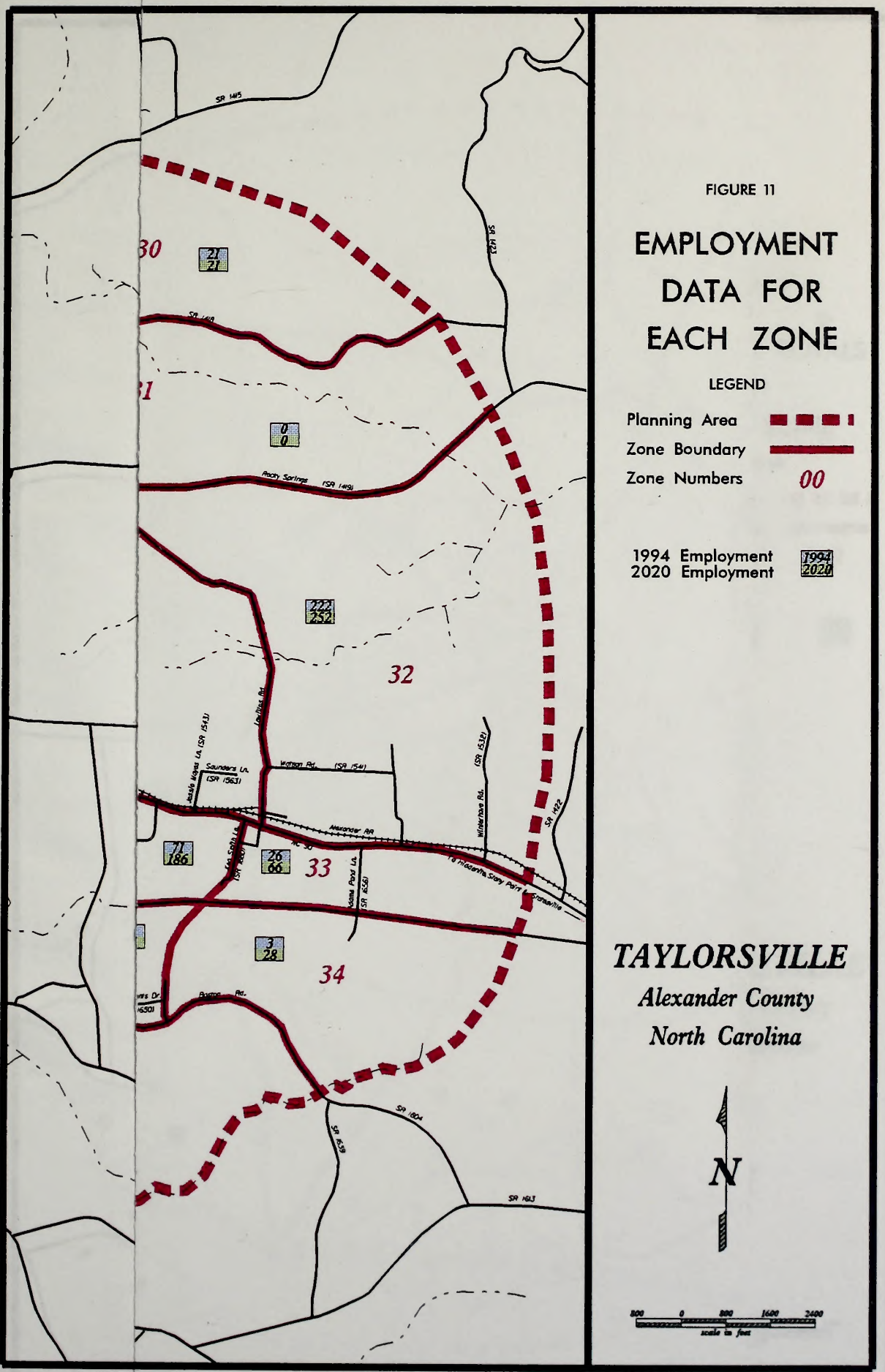
In order to make use of the model the base year data must be modified to reflect assumed conditions in the design year. These projections and the previously developed regression equations were used to produce trip productions and attractions in the same manner as the base year.

Employment Projections - A linear projections of the employment to population ratio based on the 1978 and 1992 employment surveys was done to determine the future ratios. This ratio is expected to decrease in the future from its current value of 0.61 to 0.56 by the year 2020. Using the future population figure and employment/population ratio, the

number of jobs in the planning area was determined. Based on the Standard Industrial Code the major job type is office. This trend is expected to continue in the future. Figure 11 compares the stratification of employment data in 1992 with the assumed stratification in 2020.

Dwelling Unit Projections - Future dwelling units were determined by extending person per dwelling unit trends for Alexander County linearly to the design year. The number of dwelling units are projected to increase by 1.5% per year. The distribution and projection of 2020 housing was done by the Statewide Planning Branch and verified by the Town of Taylorsville and the Alexander County Planning Department. Figure 12 compares the stratification of dwelling units in 1994 with the assumed stratification in 2020.

External and Through Trips - For the design year, external and through trips were projected from the base year using a linear projection of the past growth rate at each external station (Table 12).


SR 1415
SR 1419
Rocky Springs (SR 1419)
SR 1422
30
31
32
33
34
0
0
2
21
222
252
11
186
26
66
3
28
Jessie Mae Ln (SR 1543)
Lowrance Rd.
Saunders Ln. (SR 1563)
Watson Rd. (SR 1541)
Alexander RR
NC 90
SR 1503
Wilkerson Rd.
(SR 1532)
SR 1422
Philadelphia Story Pant Evangelic
Roma Pond Ln. (SR 1561)
Burns Rd.
SR 1604
SR 1639
SR 1613
FIGURE 11
EMPLOYMENT DATA FOR EACH ZONE
LEGEND
Planning Area
Zone Boundary
Zone Numbers 00
1994 Employment
2020 Employment 1994 2020
TAYLORSVILLE
Alexander County
North Carolina
N
800 0 800 1600 2400
scale in feet

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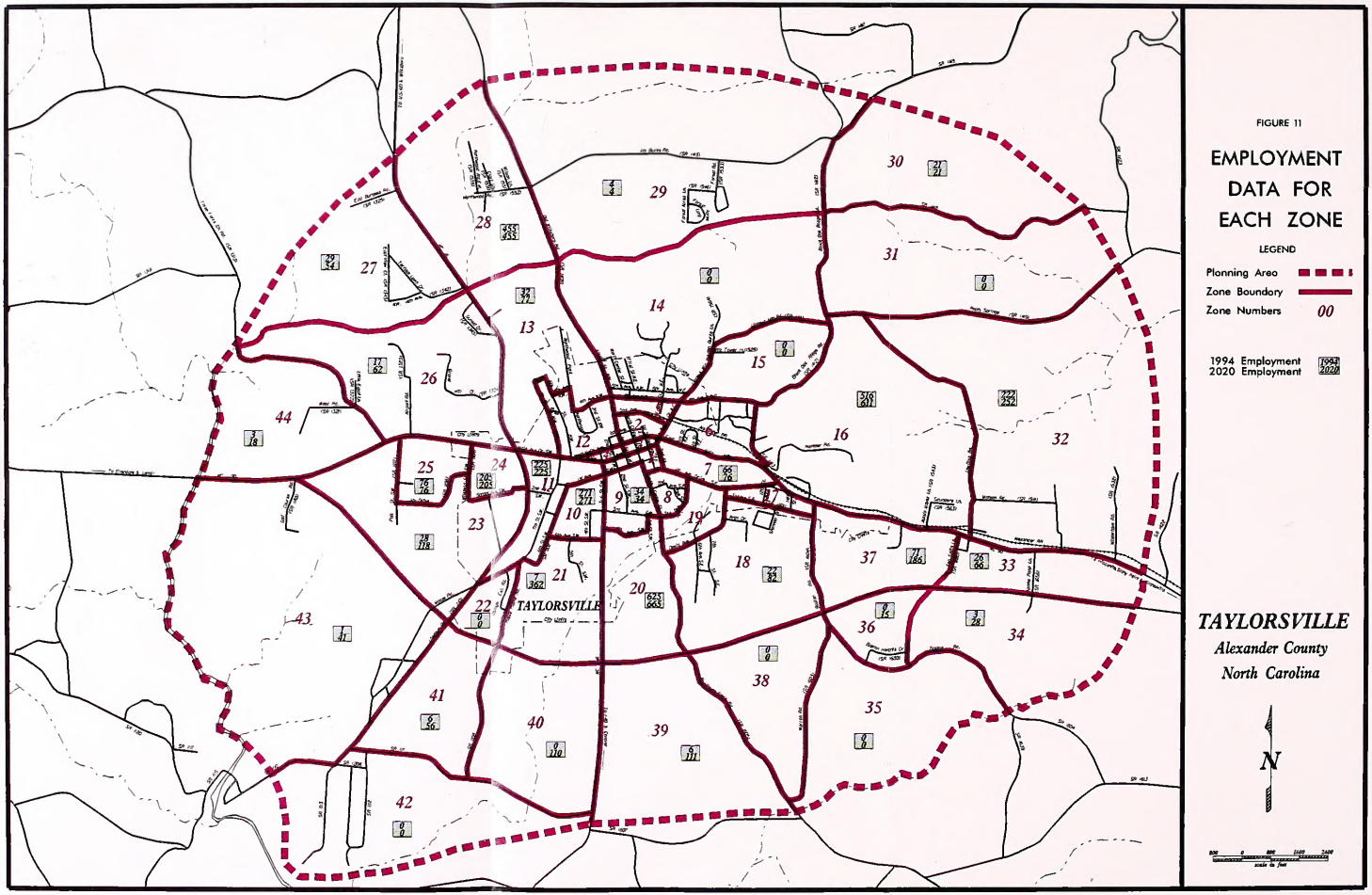
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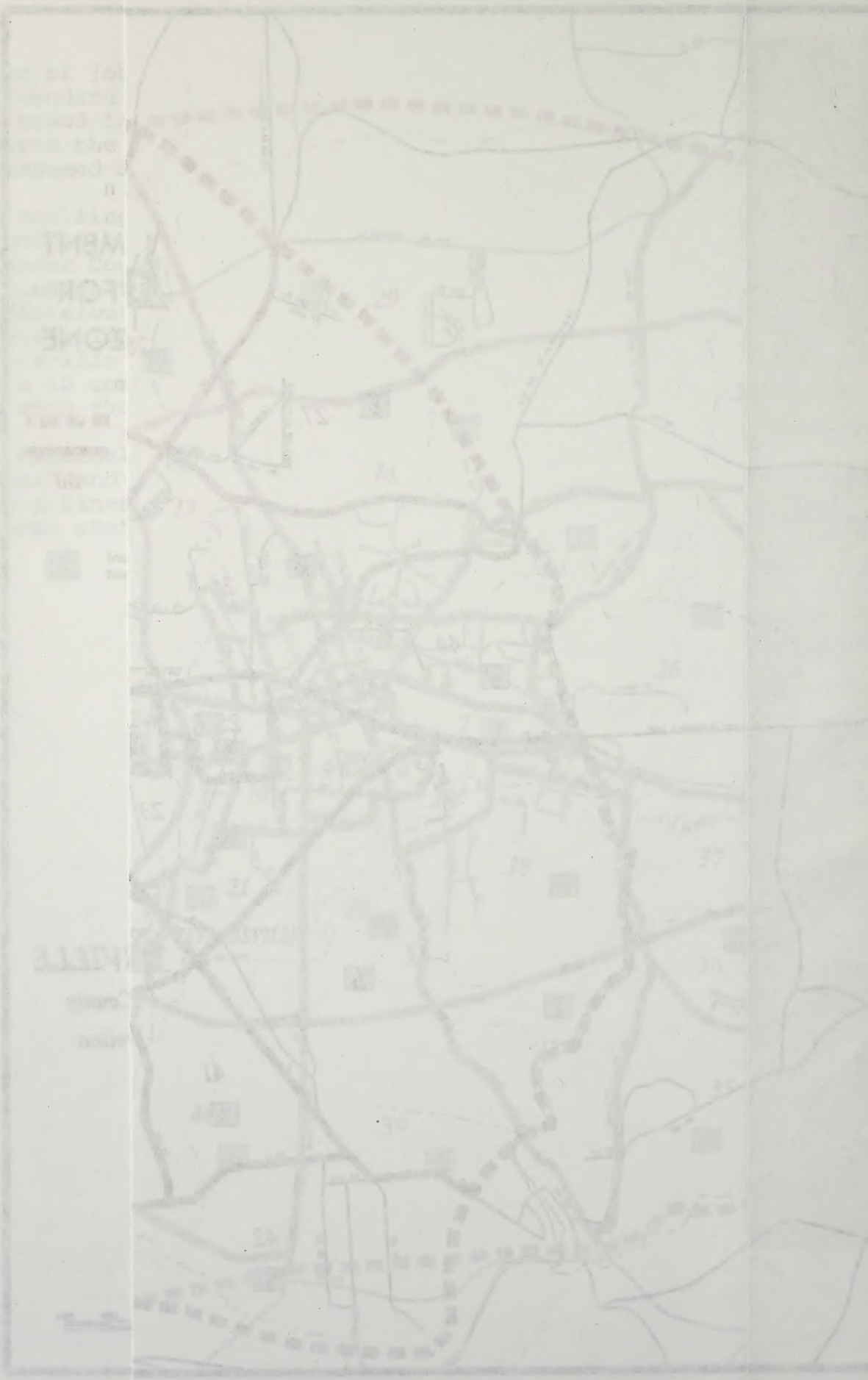
Planning Area
Zone Boundary
Zone Numbers 00
1994 Employment
2020 Employment
TAYLORSVILLE
Alexander County
North Carolina
N
TAYLORSVILLE



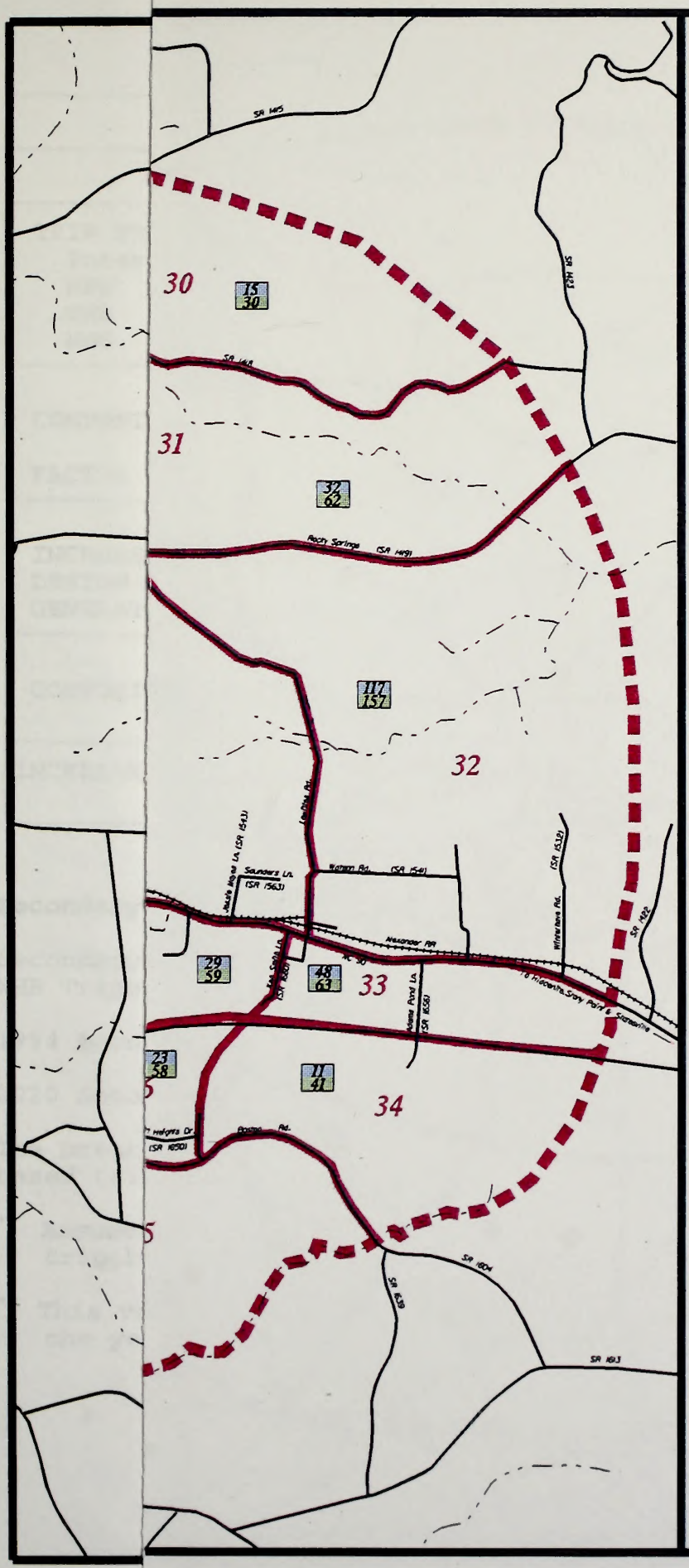


FIGURE 12

HOUSING TOTALS IN EACH ZONE

LEGEND

Planning Area

Zone Boundary

Zone Numbers 00

1994 Housing
2020 Housing 1994/2020

TAYLORSVILLE

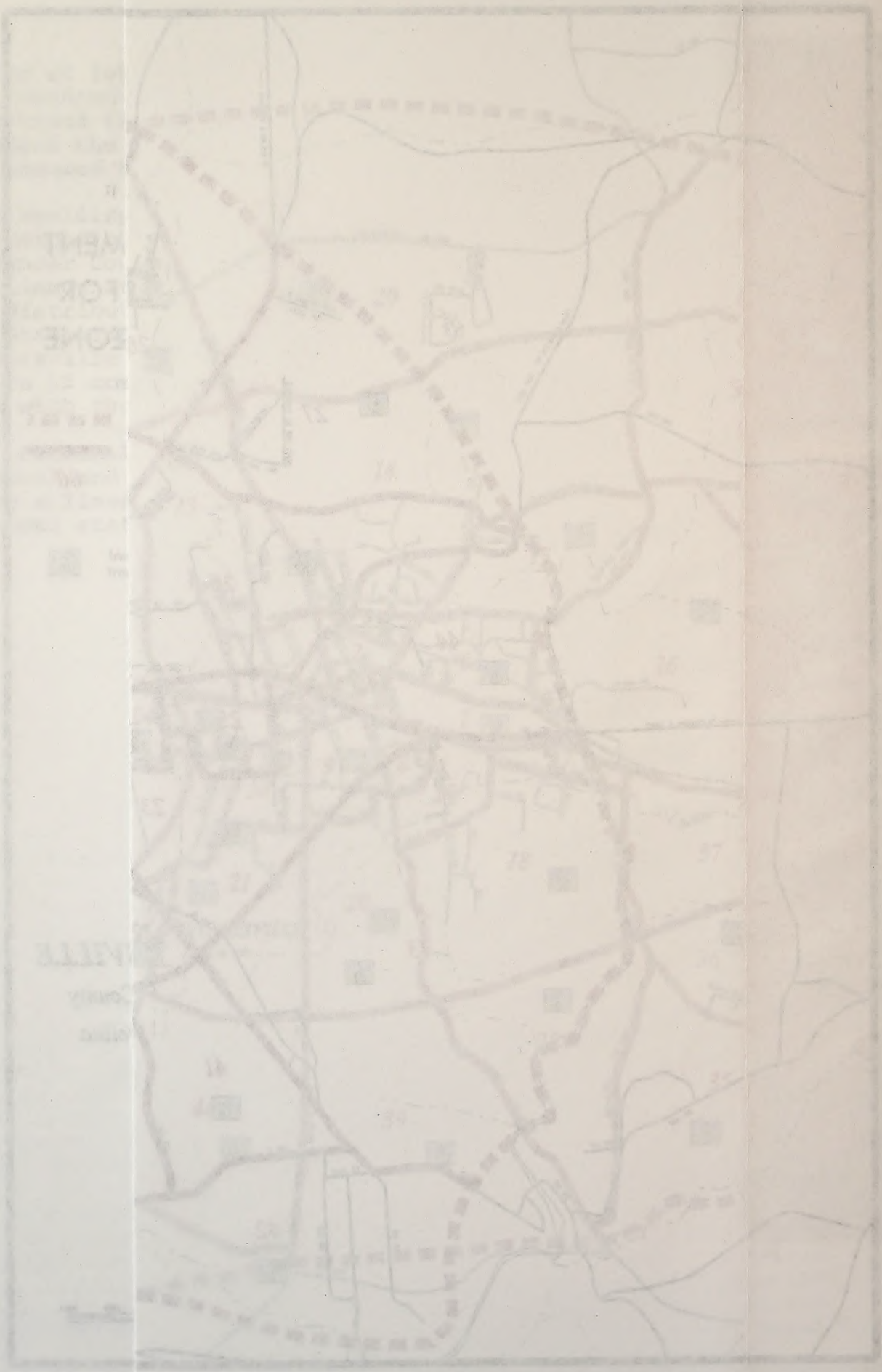
Alexander County

North Carolina

N

800 0 800 1600 2400

scale in feet



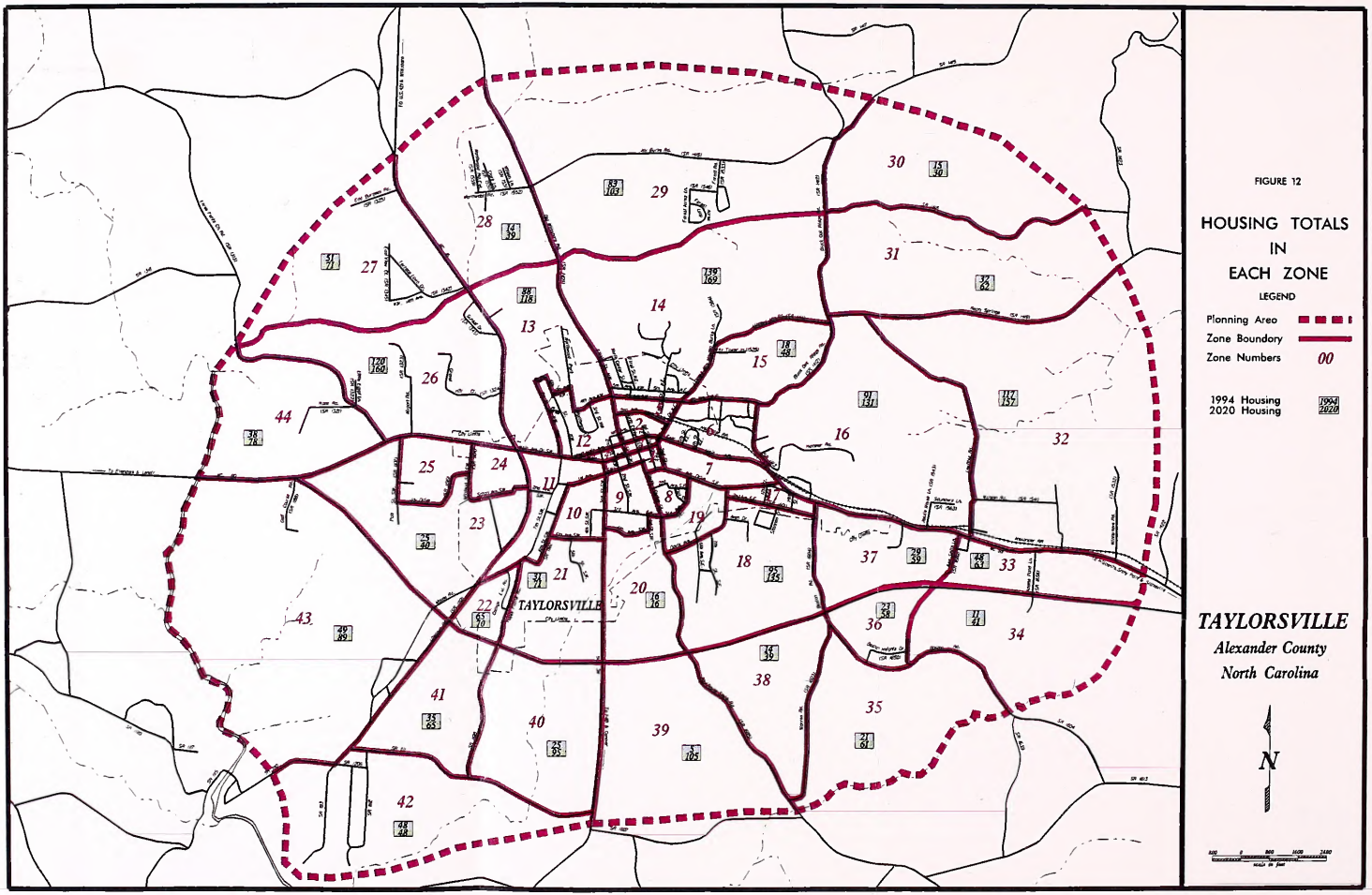


FIGURE 12
HOUSING TOTALS IN EACH ZONE
LEGEND
Planning Area
Zone Boundary
Zone Numbers 00
1994 Housing
2020 Housing 1994/2020
TAYLORSVILLE
Alexander County
North Carolina
N
TAYLORSVILLE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

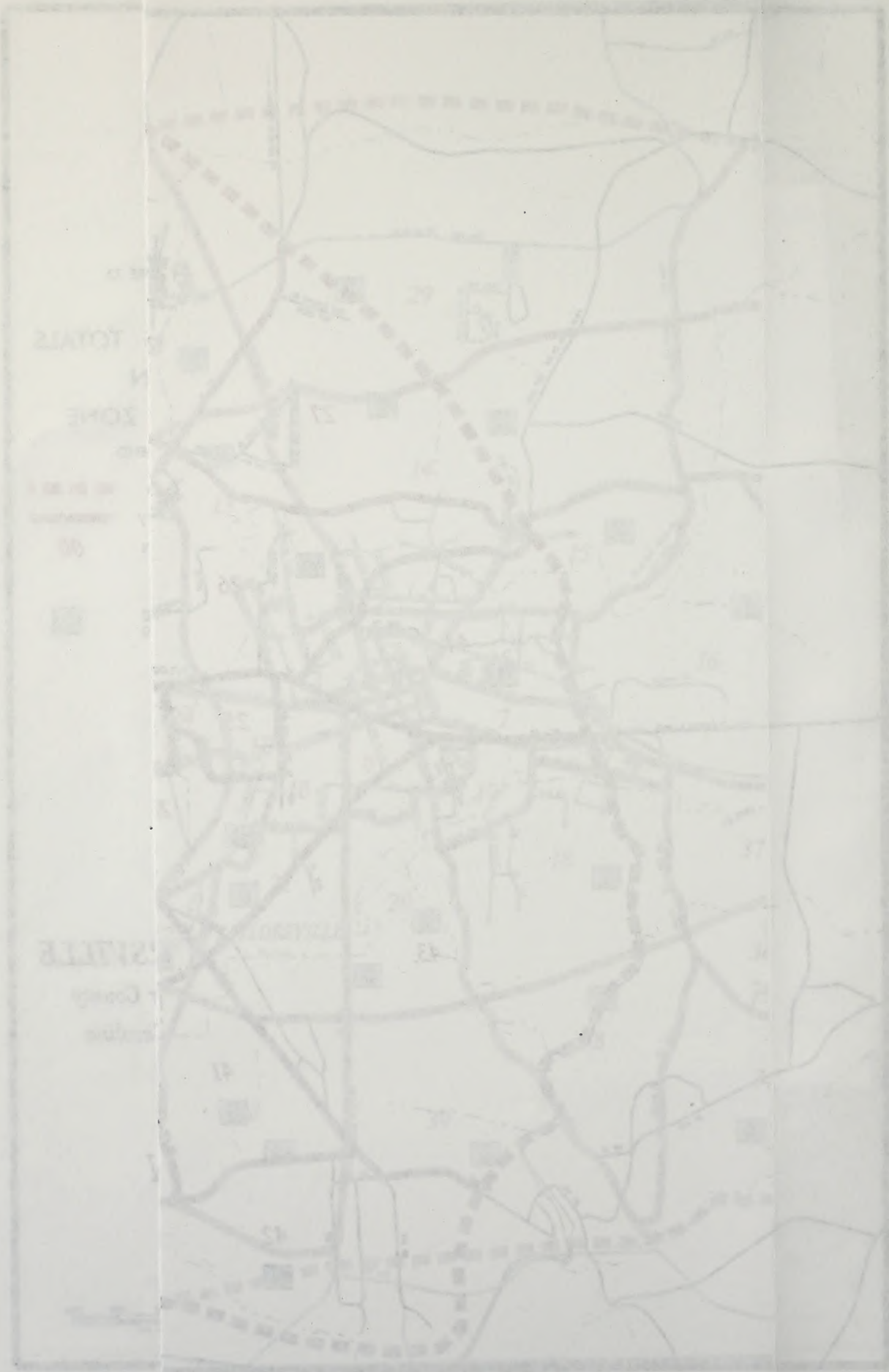


TABLE 10

Travel Model Input Variables

TRIP PERCENTAGES BY PURPOSE	YEAR	PERSON/DU	PERSONS/VEH
Internal of Total 87%			
HBW 24%	1994	2.5	1.2
OHB 52%			
NHB 24%	2020	2.4	1.0

$$\text{COMPOSITE FACTOR} = \frac{\text{1994 PERSON/VEH}}{\text{2020 PERSON/VEH}} \times \text{USAGE FACTOR} \times \frac{\text{2020 PERSON/DU}}{\text{1994 PERSON/DU}}$$

$$\text{INCREASE FOR DESIGN YEAR GENERATION RATES} = \text{AVERAGE 1994 TRIP RATE} \times \text{COMPOSITE FACTOR} - \text{AVERAGE 1994 TRIP RATE}$$

$$\text{COMPOSITE FACTOR} = \frac{1.20}{1.00} \times 0.95 \times \frac{2.40}{2.50} = 1.09$$

INCREASE FOR 2020 GENERATION RATES = (7.50 X 1.09) - 7.50 = 0.67
(Use 0.70)

Secondary NHB Trip Development:

Secondary NHB Trips = Total Ext-Int Trips - Ext-Int Trips Garaged Inside Planning Area x 0.50*

1994 Secondary Trips = (23,921 - 1,868) x 0.5 = 11,027

2020 Secondary Trips = (41,164 - 2,931) x 0.4** = 15,293

The breakdown of internal trips by purpose and total of non-home based trips generated externally are shown in Table 11.

* Assumed NHB trip making rate per each one-way external-internal trip by vehicles garaged outside the planning area.

** This value was assumed due to an increase of 1500 new jobs by the year 2020.

TABLE 11

Travel Data Summary

TYPE	1994	2020
Average Daily Trips per DU	7.63	8.20
Internal Trips	23,532	34,906
Home Based Work	3,001	4,707
Other Home Based	6,503	10,199
None-Home Based, internal	3,001	4,707
NHB secondary	11,027	15,293
Internal <-> External	23,921	41,164
Through Trips	12,580	31,840
TOTAL DAILY TRIPS	47,453	76,070

TABLE 12

Cordon Station Travel

COMPUTER STATION	BASE YEAR - 1994 Total ADT	Thru Trip End	Ext-Int Trips	FUTURE YEAR 2020 Total ADT	Thru Trip End	Ext-Int Trips
55	5600	1,996	3,604	12,077	6,270	5,807
56	700	106	594	906	140	766
57	6860	2,770	4,090	11,480	5,952	5,528
58	2100	400	1,700	3,514	784	2,730
59	250	30	220	418	50	368
60	700	98	602	900	126	774
61	500	66	434	837	114	723
62	1300	220	1,080	2,175	412	1,763
63	6800	2,738	4,062	14,665	6,596	8,069
64	1	0	1	6,470	2,510	3,960
65	300	34	266	502	64	438

TABLE 12 (Contd)						
Cordon Station Travel						
66	870	128	742	1,456	230	1,226
67	7820	3,356	4,464	13,086	7,332	5,754
68	2700	638	2,062	4,518	1,258	3,260

TABLE 13

Friction Factors & Travel Curve Data
Taylorsville

	FRICTION FACTORS				TRAVEL CURVES			
					%TRIPS DISTRIBUTED			
TIME INTERVAL	HBW	OHB	NHB	EXT-INT	HBW	OHB	NHB	EXT-INT
1	82107	118146	98355	24150	0.00	0.00	0.00	0.00
2	35355	39936	51893	18674	60.78	65.70	62.70	23.34
3	11731	12475	18308	13282	31.78	27.53	32.51	35.00
4	3319	3713	5050	9058	6.76	5.84	4.36	30.00
5	886	1086	1274	6174	0.50	0.68	0.38	11.66
6	247	322	343	4384	0.18	0.11	0.05	0.00

VIII. Thoroughfare Planning Principles

Objectives

Typically, the urban street system occupies 25 to 30 percent of the total developed land in an urban area. Since the system is permanent and expensive to build and maintain, much care and foresight are needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system that will meet existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with the changing traffic patterns. A thoroughfare plan will enable street improvements to be made as traffic demands needless expense can be averted. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained, requiring a minimum amount of land for street purposes. In addition to providing for traffic needs th thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban community. The location of present and future population, commercial and industrial development affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban development pattern.

Other objectives of a thoroughfare plan include:

1. providing for the orderly development of an adequate major street system as land development occurs,
2. reducing travel and transportation costs,
3. reducing the cost of major street improvements to the public through the coordination of the street system with private action,
4. enabling private interests to plan their actions, improvements, and development with full knowledge of public intent,
5. minimizing disruption and displacement of people and businesses through long range advance planning for major street improvements.
6. reducing environmental impacts, such as air pollution, resulting from transportation, and
7. increasing travel safety.

Thoroughfare planning objectives are achieved through both improving the operational efficiency of thoroughfares, and improving the system efficiency through system coordination and layout.

Operational Efficiency

A street's operational efficiency is improved by increasing the capability of the street to carry more vehicular traffic and people. In terms of vehicular traffic, a street's capacity is defined by the maximum number of vehicles which can pass a given point on a roadway during a given time period under under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic, and weather.

Physical ways to improve vehicular capacity include street widening, intersection improvements, improvements vertical and horizontal alignment, and eliminating roadside obstacles. For example widening of a street from two to four lanes more than doubles the capacity of the street by providing additional maneuverability for traffic. This reduces the impedances to traffic flow caused by slow moving or turning vehicles and the adverse effects of horizontal and vertical alignments.

Operational ways to improve street capacity include:

1. Control of access -- a roadway with complete access control can often carry three times the traffic handled by a non-controlled access street with identical lane width and number.

2. Parking removal -- Increases capacity by providing additional street width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.

3. One-way operation -- The capacity of a street can sometimes be increased 20-50%, depending upon turning movements and overall street width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.

4. Reversible Lane -- Reversible traffic lanes may be used to increase street capacity in situations where heavy directional flows occur during peak periods.

5. Signal phasing and coordination -- Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing streets. Travel demand can be reduced or altered in the following ways:

1. Encourage people to form carpools and vanpools for journeys to work and other vehicle trip purposes. This reduces the number of vehicles on the roadway and raises the people carrying capability of teh street system.

2. Encourage the use of transit and bicycle modes.

3. Encourage industries, businesses, and institutions to stagger work hours or establish variable work hours for employees. This will spread peak travel over a longer time period and thus reduce peak hour demand.

4. Plan and encourage land use development or redevelopment in a more travel efficient manner.

System Efficiency

Another means for altering travel demand is the development of a more efficient system of streets that will better serve travel desires. A more efficient system can reduce travel distances, time, and cost to the user. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

Functional Classification

Streets perform two primary functions -- traffic service and land service, which when combined, are basically incompatible. The conflict is not serious if both traffic and land service demands are low. However, when traffic volumes area high, conflicts created by uncontrolled and intensely used abutting property leads to intolerable traffic flow friction and congestion.

The underlying concept of the thoroughfare plan is that it provides a functional system of streets which permits travel from origins to destinations with directness, ease, and safety. Different streets in the system area designed and called on to perform specific functions, thus minimizing the traffic and land service conflict. Streets area categorized as to function as local access streets, minor thoroughfares, or major thoroughfares.

Local Access Streets provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located such that only traffic with

origins and destinations of the streets could be served. Local streets may be further classified as either residential, commercial, and/or industrial depending upon the type of land use which they serve.

Minor Thoroughfares are more important streets on the city system. They collect traffic from local access streets and carry it to the major thoroughfares. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function that may be performed is that of providing access to abutting property. They should be designed to serve limited areas so that their development as major thoroughfares will be prevented.

Major Thoroughfares are the primary traffic arteries of the city. Their function is to move intra-city and inter-city traffic. The streets which comprise the major thoroughfare system may also serve abutting property, however, their principle function is to carry traffic. They should not be bordered by uncontrolled strip development because such development significantly lowers the capacity of the thoroughfare to carry traffic and each driveway is a danger and impediment to traffic flow. Major thoroughfares may range from a two-lane street carrying minor traffic volumes to major expressways with four or more traffic lanes. Parking normally should not be permitted on major thoroughfares.

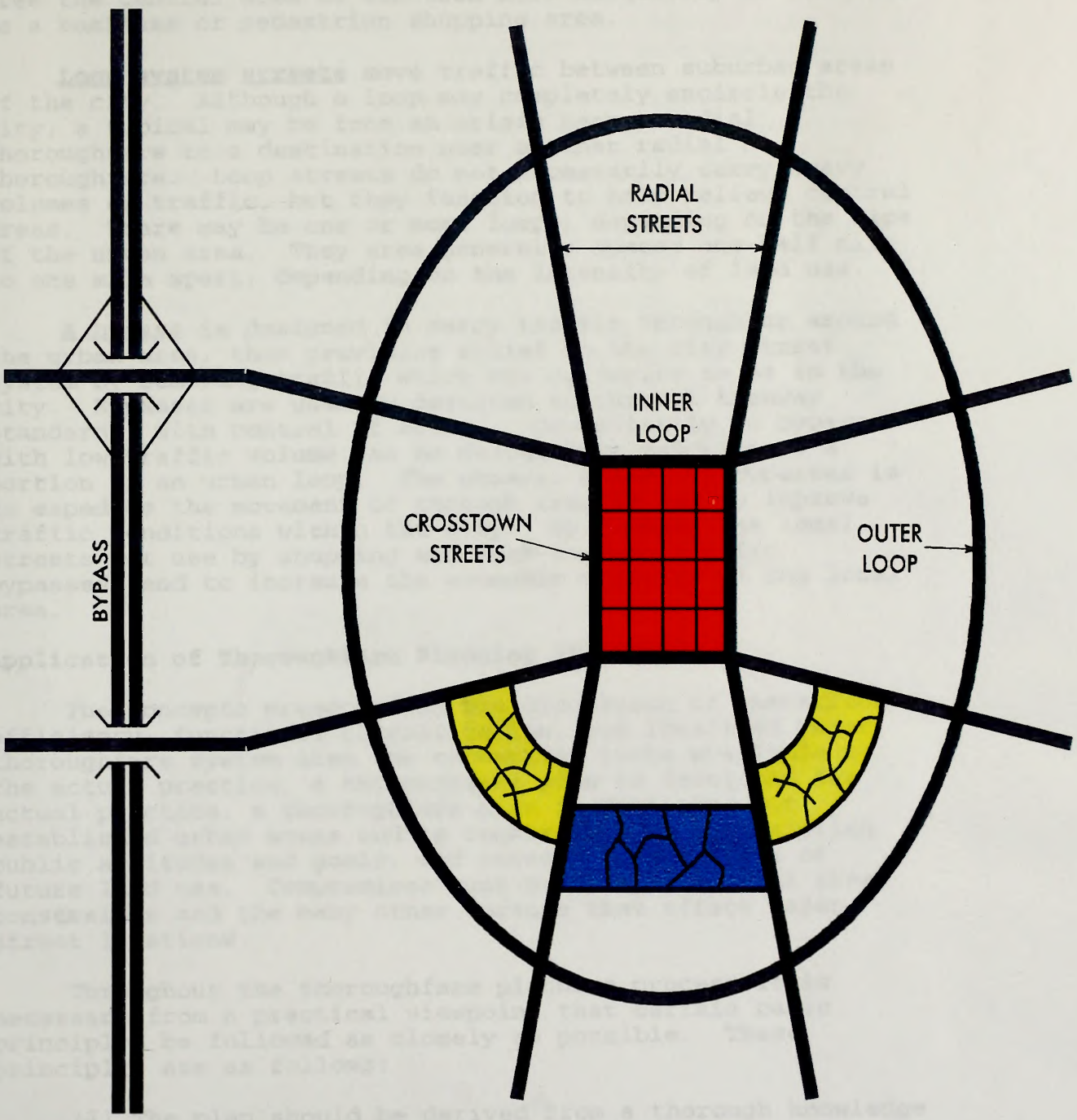
Idealized Major Thoroughfare System

A coordinated system of major thoroughfares forms the basic framework of the urban street system. A major thoroughfare system which is most adaptable to desire lines of travel within an urban area is the radial-loop system. It permits movement between various areas of the city within maximum directness. This system consists of several functional elements--radial streets, crosstown streets, loop system streets, and bypasses (Figure 13)

Radial streets provide for traffic movement between points located on the outskirts of the city and the central area. This is a major traffic movement in most cities and the economic strength of the central business district depends upon the adequacy of this type of thoroughfare.

If all radial streets crossed in the central area, an intolerable congestion problem would result. To avoid this problem, it is very important to have a system of crosstown streets which form a loop around the central business district. This system allows traffic moving from origins on one side of the central area to destinations on the other side to follow the area's border. It also allows central area traffic to circle and then enter the area near a given

IDEAL SMALL URBAN THOROUGHFARE PLAN



MAJOR THOROUGHFARE BYPASS

OTHER MAJOR THOROUGHFARES

MINOR THOROUGHFARES

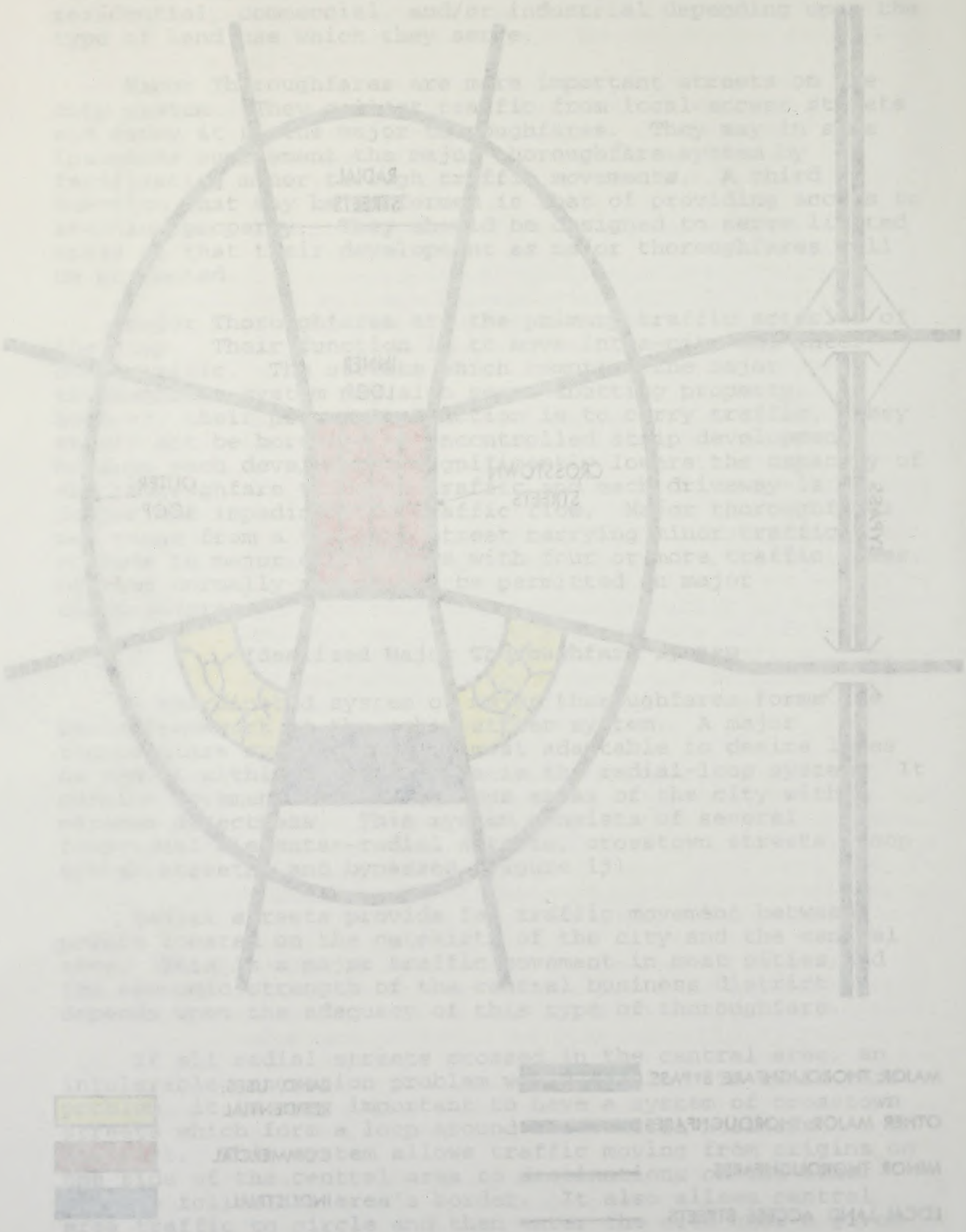
LOCAL LAND ACCESS STREETS

LAND USES:
RESIDENTIAL

COMMERCIAL

INDUSTRIAL

Figure 13



destination. The effect of a good crosstown system is to free the central area to function more adequately in its role as a business or pedestrian shopping area.

Loop system streets move traffic between suburban areas of the city. Although a loop may completely encircle the city, a typical may be from an origin near a radial thoroughfare to a destination near another radial thoroughfare. Loop streets do not necessarily carry heavy volumes of traffic, but they function to help relieve central areas. There may be one or more loops, depending on the size of the urban area. They area generally spaced one-half mile to one mile apart, depending on the intensity of land use.

A bypass is designed to carry traffic through or around the urban area, thus providing relief to the city street system by removing traffic which has no desire to be in the city. Bypasses are usually designed to through-highway standards, with control of access. Occasionally, a bypass with low traffic volume can be designed to function as a portion of an urban loop. The general effect of bypasses is to expedite the movement of through traffic and to improve traffic conditions within the city. By freeing the local streets for use by shopping and home-to-work traffic, bypasses tend to increase the economic vitality of the local area.

Application of Thoroughfare Planning Principles

The concepts presented in the discussion of operational efficiency, functional classification, and idealized major thoroughfare system area the conceptual tools available to the actual practice, a thoroughfare plan is developed for actual practice, a thoroughfare plan is developed for established urban areas and is constrained by the existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these constraints and the many other factors that affect major street locations.

Throughout the thoroughfare planning process it is necessary from a practical viewpoint that certain basic principles be followed as closely as possible. These principles are as follows:

(1) The plan should be derived from a thorough knowledge of today's travel - its component parts as well as factors that contribute to it, limit it, and modify it.

(2) Traffic demands must be sufficient to warrant the designation and development of each major street. The thoroughfare plan should be designed to accommodate a large portion of all major traffic

movements on a relatively few streets.

(3) The plan should conform to and provide for the land development plan of the area.

(4) Certain considerations must be given to urban development beyond the current planning period. Particularly in outlying or sparsely developed areas which have development potential, it is necessary to designate thoroughfares on a long-range planning basis to protect right-of-way for future thoroughfare development.

(3) While being consistent with the above principles and realistic in terms of travel trends, the plan must be economically feasible.

APPENDICES

APPENDIX A

APPENDIX A
PLANNING AREA HOUSING AND EMPLOYMENT DATA

TABLE A-1
DWELLING UNIT SUMMARY 1993

ZONE	EXCELLENT	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	POOR	TOTAL DU'S
1	0	0	24	0	0	24
2	0	0	3	0	0	3
3	0	0	0	0	0	0
4	0	0	3	0	0	3
5	0	0	58	0	0	58
6	0	0	7	12	4	23
7	0	2	81	4	1	88
8	0	1	29	15	0	45
9	0	12	13	0	0	25
10	0	0	7	8	14	29
11	1	2	24	18	6	51
12	0	0	61	0	0	61
13	0	30	58	0	0	88
14	0	0	139	0	0	139
15	0	8	19	20	1	48
16	0	0	21	61	9	91
17	0	0	5	14	6	25
18	0	2	37	40	16	95
19	0	1	21	20	0	42
20	0	1	12	2	1	16
21	0	0	0	16	15	31
22	0	0	47	18	0	65
23	0	0	25	0	0	25
24	0	0	4	0	0	4
25	0	0	27	0	0	27
26	0	0	90	30	0	120
27	0	0	51	0	0	51
28	0	0	14	0	0	14
29	32	0	51	0	0	83
30	0	0	10	5	0	15
31	0	1	13	16	2	32
32	0	1	66	44	6	117
33	0	4	28	12	4	48
34	0	0	5	5	1	11
35	0	1	9	9	2	21
36	0	0	20	3	0	23
37	0	0	14	13	2	29
38	0	1	12	1	0	14
39	0	0	5	0	0	5
40	0	0	25	0	0	25
41	0	0	35	0	0	35
42	0	0	48	0	0	48
43	11	0	38	0	0	49
44	0	0	8	0	30	38

TABLE A-2
EMPLOYMENT SUMMARY 1994

ZONE	INDUSTRY SIC 1-49	RETAIL 50-54, 56,57,59	SPECIAL RETAIL 55,58	OFFICE 60-67, 91-97	SERVICE 70-89	TOTAL EMP.	TOTAL CAR AND TRUCK
1	3	0	0	116	17	136	5, 10
2	31	29	0	28	27	115	0, 18
3	11	14	3	15	21	64	0, 0
4	0	0	34	0	3	37	0, 3
5	0	0	0	7	0	7	0, 0
6	44	32	0	6	12	94	0, 17
7	0	4	42	7	13	66	0, 3
8	0	0	0	0	0	0	0, 0
9	0	8	9	0	17	34	1, 1
10	93	3	0	0	175	271	0, 7
11	18	8	67	91	41	225	0, 15
12	0	9	0	19	10	38	0, 0
13	0	10	0	0	22	32	0, 7
14	0	0	0	0	0	0	0, 0
15	0	0	0	0	0	0	0, 0
16	499	9	8	0	0	516	0, 14
17	0	11	4	0	10	25	0, 4
18	20	2	0	0	0	22	0, 4
19	0	0	0	0	0	0	0, 0
20	369	64	5	6	181	625	0, 6
21	0	0	0	0	7	7	128BUSES
22	0	0	0	0	0	0	0, 0
23	0	0	0	28	0	28	0, 0
24	23	121	53	3	5	205	0, 2
25	0	0	0	0	76	76	0, 10
26	0	0	8	4	5	17	0, 4
27	27	0	0	0	2	29	0, 2
28	455	0	0	0	0	455	0, 10
29	0	2	2	0	0	4	0, 0
30	21	0	0	0	0	21	0, 1
31	0	0	0	0	0	0	0, 0
32	216	6	0	0	0	222	0, 16
33	0	0	0	0	26	26	0, 8
34	0	0	0	0	3	3	0, 1
35	0	0	0	0	0	0	0, 0
36	0	0	0	0	0	0	0, 0
37	0	38	25	0	8	71	0, 0
38	0	0	0	0	0	0	0, 0
39	0	6	0	0	0	6	0, 0
40	0	0	0	0	0	0	0, 0
41	6	0	0	0	0	6	0, 0
42	0	0	0	0	0	0	0, 0
43	0	0	0	0	1	1	0, 0
44	0	0	0	0	3	3	0, 0

TABLE A-3
DWELLING UNIT SUMMARY 2020

ZONE	EXCELLENT	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	POOR	TOTAL DU'S
1	0	0	24	0	0	24
2	0	0	3	0	0	3
3	0	0	0	0	0	0
4	0	0	3	0	0	3
5	0	0	58	0	0	58
6	0	0	23	0	0	23
7	0	0	88	0	0	88
8	0	0	45	0	0	45
9	0	0	25	0	0	25
10	0	0	29	0	0	29
11	0	0	51	0	0	51
12	0	0	61	0	0	61
13	0	0	118	0	0	118
14	0	0	169	0	0	169
15	0	0	68	0	0	68
16	0	0	131	0	0	131
17	0	0	25	0	0	25
18	0	0	135	0	0	135
19	0	0	42	0	0	42
20	0	0	16	0	0	16
21	0	0	71	0	0	71
22	0	0	70	0	0	70
23	0	0	40	0	0	40
24	0	0	4	0	0	4
25	0	0	27	0	0	27
26	0	0	160	0	0	160
27	0	0	71	0	0	71
28	0	0	39	0	0	39
29	0	0	103	0	0	103
30	0	0	30	0	0	30
31	0	0	62	0	0	62
32	0	0	157	0	0	157
33	0	0	63	0	0	63
34	0	0	41	0	0	41
35	0	0	61	0	0	61
36	0	0	58	0	0	58
37	0	0	59	0	0	59
38	0	0	39	0	0	39
39	0	0	105	0	0	105
40	0	0	95	0	0	95
41	0	0	65	0	0	65
42	0	0	48	0	0	48
43	0	0	89	0	0	89
44	0	0	78	0	0	78

TABLE A-4
EMPLOYEE SUMMARY 2020

ZONE	INDUSTRY SIC 1-49	RETAIL 50-54, 56,57,59	SPECIAL RETAIL 55,58	OFFICE 60-67, 91-97	SERVICE 70-89	TOTAL EMP.	COMMERCIAL CAR AND TRUCK
1	3	0	0	116	17	136	5, 10
2	31	29	0	28	27	115	0, 18
3	11	14	3	15	21	64	0, 0
4	0	0	34	0	3	37	0, 3
5	0	0	0	7	0	7	0, 0
6	44	32	0	6	12	94	0, 17
7	0	4	42	17	13	76	0, 3
8	0	0	0	0	0	0	0, 0
9	0	8	9	0	17	34	1, 1
10	93	3	0	0	175	271	0, 7
11	18	8	67	91	41	225	0, 15
12	0	9	0	19	10	38	0, 0
13	0	20	10	10	37	77	0, 9
14	0	0	0	0	0	0	0, 0
15	0	0	0	0	0	0	0, 0
16	529	19	28	10	15	611	0, 22
17	0	11	4	0	10	25	0, 4
18	20	27	10	10	15	82	0, 7
19	0	0	0	0	0	0	0, 0
20	369	74	15	16	191	665	0, 8
21	300	15	20	10	17	362	0, 13
							128 BUSES
22	0	0	0	0	0	0	0, 0
23	30	25	15	38	10	118	0, 8
24	23	121	53	3	5	205	0, 2
25	0	0	0	0	76	76	0, 10
26	0	10	18	14	20	62	0, 7
27	27	0	0	15	12	54	0, 3
28	455	0	0	0	0	455	0, 10
29	0	2	2	0	0	4	0, 0
30	21	0	0	0	0	21	0, 1
31	0	0	0	0	0	0	0, 0
32	216	6	10	10	10	252	0, 16
33	0	15	10	0	41	66	0, 10
34	0	0	15	0	13	28	0, 4
35	0	0	0	0	0	0	0, 0
36	0	0	15	0	0	15	0, 2
37	60	63	35	10	18	186	0, 10
38	0	0	0	0	0	0	0, 0
39	40	26	20	10	15	111	0, 10
40	30	20	35	10	15	110	0, 8
41	6	10	15	15	10	56	0, 4
42	0	0	0	0	0	0	0, 0
43	0	15	15	0	11	4	0, 4
44	0	0	0	0	18	18	0, 2

APPENDIX B

APPENDIX B

TYPICAL THOROUGHFARE CROSS SECTIONS

Cross section requirements for thoroughfares vary according to the desired capacity and level of service to be provided. Universal standards in the design of thoroughfares are not practical. Each street section must be individually analyzed and its cross section requirements determined on the basis of amount and type of projected traffic, existing capacity, desired level of service, and available right-of-way.

Typical cross section recommendations are shown in the figures following this literature. These cross sections are typical for facilities on new location and where right-of-way constraints are not critical. For widening projects and urban projects with limited right-of-way, special cross sections should be developed that meet the needs of the project.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service, and available right-of-way.

On all existing and proposed major thoroughfares delineated on the thoroughfare plan, adequate right-of-way should be protected or acquired for the ultimate cross sections. Recommendations for "ultimate" cross sections are provided for (1) thoroughfares which may require widening after the current planning period; (2) for thoroughfares which are borderline adequate and accelerated traffic growth could render them deficient; and (3) for thoroughfares where an urban curb and gutter cross section may be locally desirable because of urban development or redevelopment.

Recommended design standards relating to maximum and minimum grades, minimum sight distances, maximum degree of curve and related super elevation, and other considerations for thoroughfares are given in Appendix D. This Appendix gives definitions and design standards recommended for inclusion in subdivision regulations.

Cross sections "A" and "L" is typical for controlled access freeways. The 14 m (46 ft) grassed median is the minimum desirable median width, but there could be some variation from this depending upon design considerations. Right-of-way requirements would typically vary upward from 70 m (228 ft) depending upon cut and fill requirements.

Cross section "B", seven lane curb and gutter, should not be used for new projects. When the conditions warrant six

lanes, cross section "D" should be recommended. Cross section "B" should be used only in special situations such as when widening from a five lane section and right-of-way is limited. Even in these situations, consideration should be given to converting the center turn lane to a median so that cross section "D" is the final cross section.

Cross section "C", five lane curb and gutter, is typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "D", "E", and "M" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections. The 4.9 m (16 ft) median is the minimum recommended for an urban boulevard type cross section. In most instances, monolithic construction should be utilized due to greater cost effectiveness, ease and speed of placement, and reduced future maintenance requirements. In special cases, grassed or landscaped medians may be used in urban areas. However, these types of medians result in greatly increased maintenance costs and an increased danger to maintenance personnel. Non-monolithic medians should only be recommended when the above concerns are addressed.

Cross section "F" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 7.3 m (24 ft) is recommended with 9.1 m (30 ft) being desirable.

Typical cross section "G" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections. This cross section should be used only if the above criteria is met. If right-of-way is not restricted, future strip development could take place and the inner lanes could become de facto left turn lanes.

In urban environments, thoroughfares which are proposed to function as one-way traffic carriers would typically require **cross section "H". Cross sections "I" and "J"** are usually recommended for urban minor thoroughfares since these facilities usually serve both land service and traffic service functions. **Cross section "I"** would be used on those minor thoroughfares where parking on both sides is needed as a result of more intense development.

Cross section "K" is used in rural areas or for staged construction of a wider multi-lane cross section. On some thoroughfares, projected traffic volumes may indicate that

two travel lanes will adequately serve travel for a considerable period of time. For areas that are growing and future widening will be necessary, the full right-of-way of 30 m (100 ft) should be required. In some instances, local ordinances may not allow the full 30 m (100 ft). In those cases, 21 m (70 ft) should be preserved with the understanding that the full 30 m (100 ft) will be preserved by use of building setbacks and future street line ordinances.

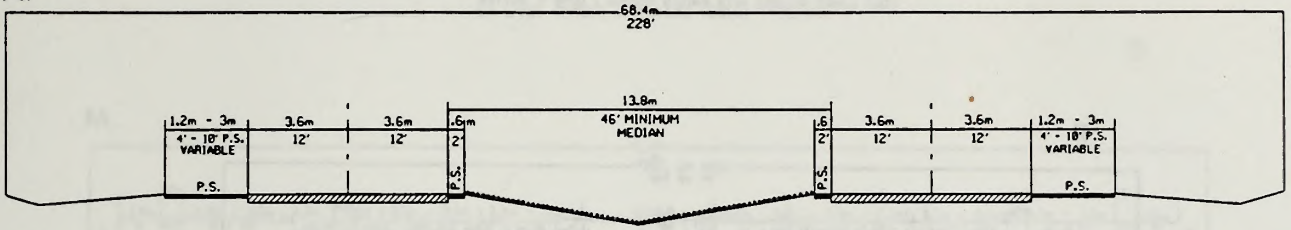
The urban curb and gutter cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk farther away from the street to provide additional separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

The right-of-ways shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require either additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle travel along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to contain the bicycle facilities. The North Carolina Bicycle Facilities Planning and Design Guidelines should be consulted for design standards for bicycle facilities. **Cross sections N, O, and P** are typically used to accommodate bicycle travel.

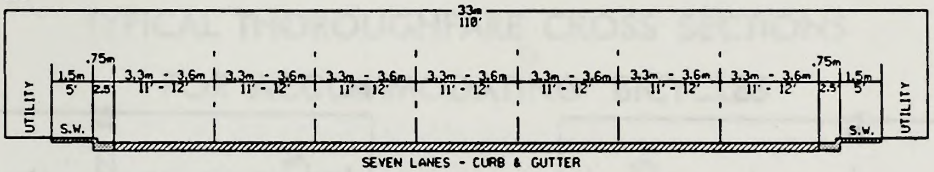
TYPICAL THOROUGHFARE CROSS SECTIONS

A.



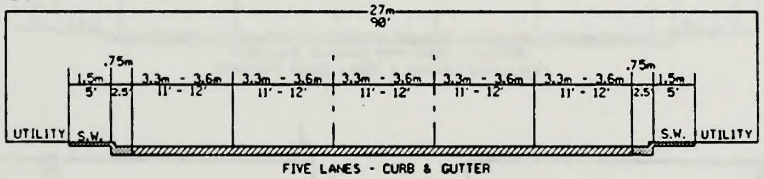
FOUR LANES DIVIDED WITH MEDIAN - FREEWAY

B.



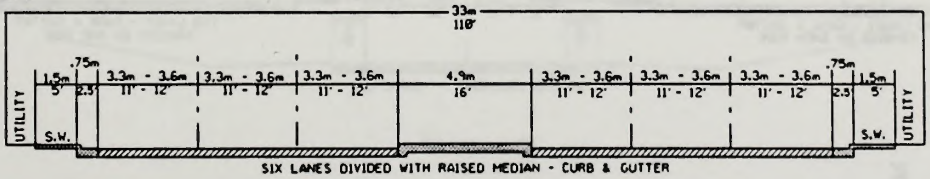
SEVEN LANES - CURB & GUTTER

C.



FIVE LANES - CURB & GUTTER

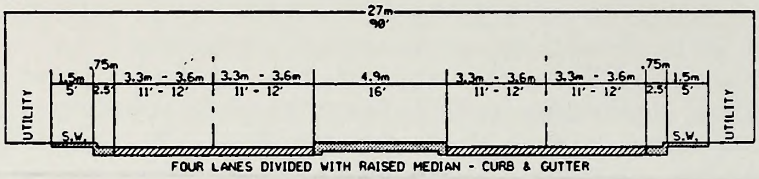
D.



SIX LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

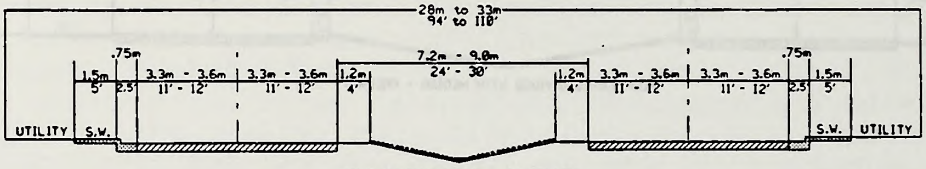
TYPICAL THOROUGHFARE CROSS SECTIONS

E.



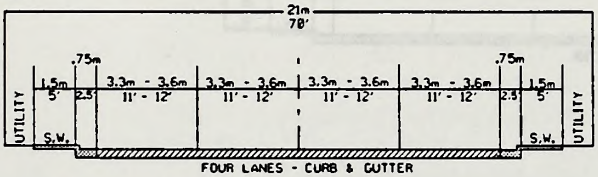
FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

F.



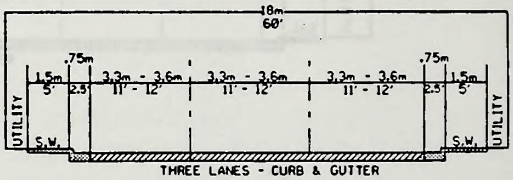
FOUR LANES DIVIDED - BOULEVARD
GRASS MEDIAN

G.



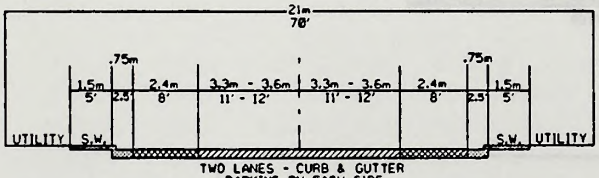
FOUR LANES - CURB & GUTTER

H.



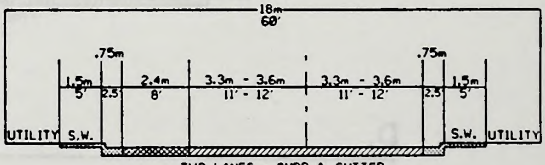
THREE LANES - CURB & GUTTER

I.



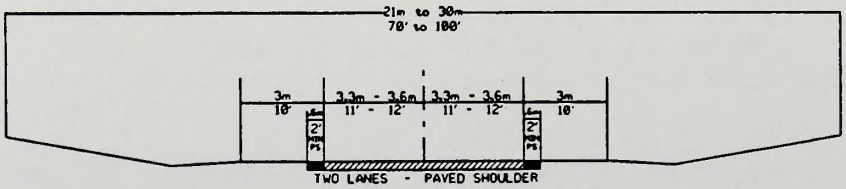
TWO LANES - CURB & GUTTER
PARKING ON EACH SIDE

J.



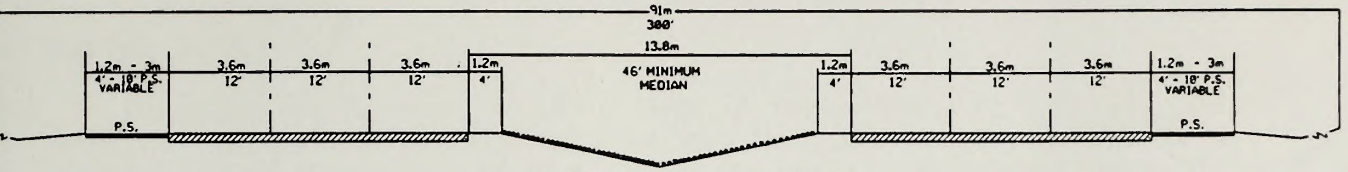
TWO LANES - CURB & GUTTER
PARKING ON ONE SIDE

K.



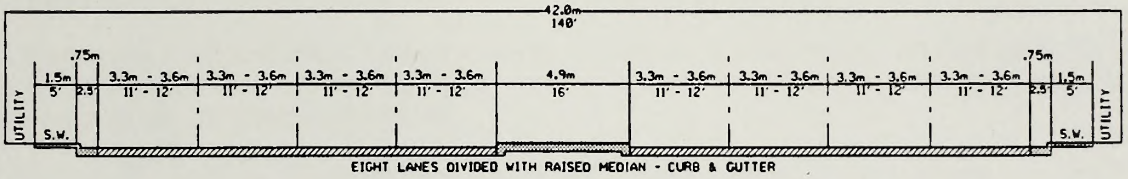
TWO LANES - PAVED SHOULDER

TYPICAL THOROUGHFARE CROSS SECTIONS



SIX LANES DIVIDED WITH GRASS MEDIAN - FREEWAY

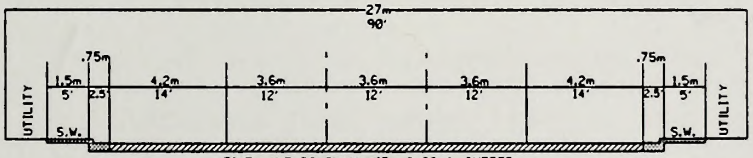
M.



EIGHT LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER

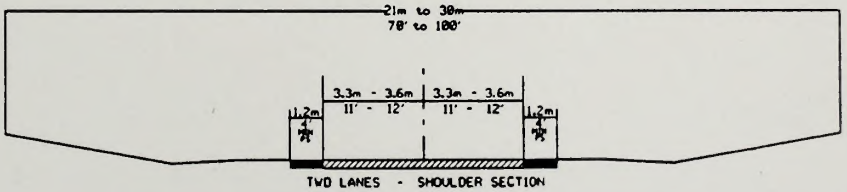
TYPICAL THOROUGHFARE CROSS SECTIONS FOR ACCOMMODATING BICYCLES

N.



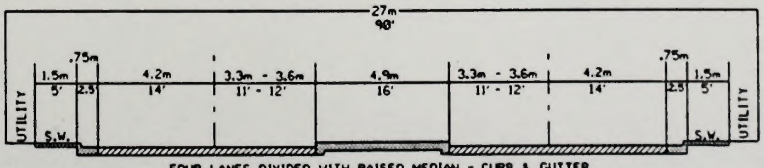
FIVE-LANE ROADWAY WITH CURB & GUTTER,
STANDARD INSIDE LANES & WIDENED CURB LANES

O.

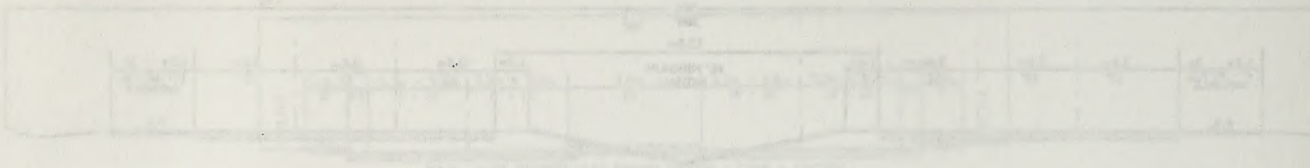


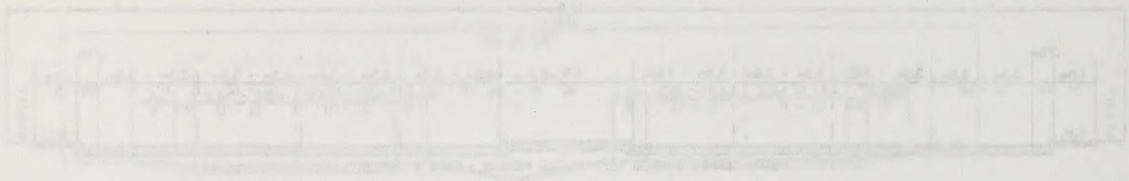
TWO LANES - SHOULDER SECTION

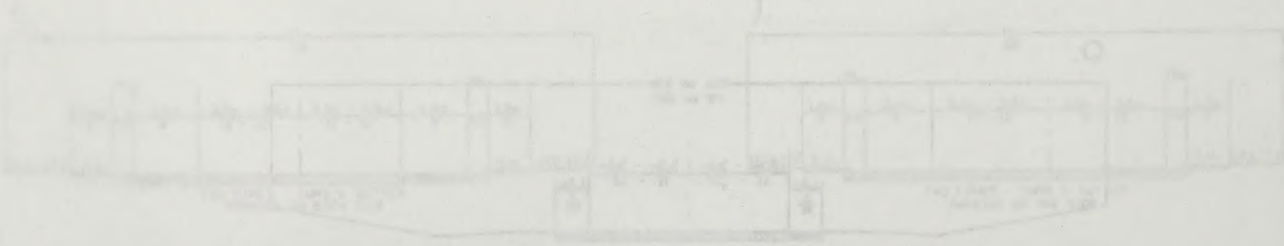
P.

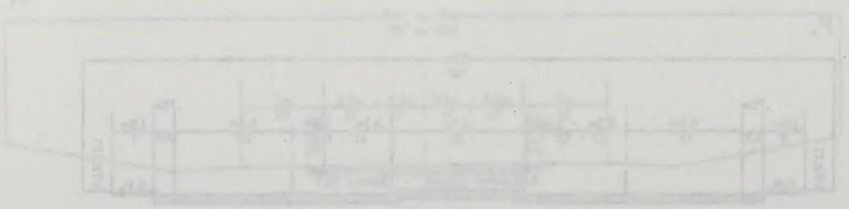


FOUR LANES DIVIDED WITH RAISED MEDIAN - CURB & GUTTER,
STANDARD INSIDE LANES & WIDENED CURB LANES









APPENDIX C

APPENDIX C

APPENDIX C

GOALS & OBJECTIVES SURVEY DATA SUMMARY FOR TAYLORSVILLE

SURVEY FORM:

In order to determine the items of importance to the planning area, a "Goals and Objectives" survey was conducted. A two page survey was distributed to the residents in the planning area through the Alexander County Chamber of Commerce, the Town of Taylorsville, and the Alexander County Planning and Inspections Department to determine the local desires and priorities in the thoroughfare plan. The survey form was organized as follows:

Page 1: Nineteen issues were scored from very undesirable (-2) to very desirable (+2) in the areas of Environment, Neighborhood, Economy, and Transportation.

Page 2: Five issues in each of five categories were ranked in order of importance (from 1-5, 1 being most important).

Additional space was provided for comments at the end of the survey.

SUMMARY PROCEDURE:

The total number respondents were 13. The number of very desirable responses for each issue on page 1 were added. The results of the survey indicated that the transportation improvements of high priority were to increase traffic safety, attract new industry, protection of neighborhoods from truck traffic and landscape streets with trees and shrubs.

For page 2, the number of times each issue received a #1 ranking was determined. It was found that issues of high priority were to revitalize existing developed areas, foster new economic development growth, and construct a Northwest loop connecting NC 90 to SR 1409 through NC 16.

APPENDIX C

GOALS & OBJECTIVES SURVEY
TAYLORSVILLE, N.C.

Circle the number to indicate how desirable the following items are to you.

Very Undesirable ---	-2
Undesirable --------	-1
Neutral ----------	N
Desirable ----------	+1
Very Desirable -----	+2

ENVIRONMENTAL ISSUES:

1) Minimize air pollution from vehicles:	-2	-1	N	+1	+2
2) Minimize traffic noise in neighborhoods:	-2	-1	N	+1	+2
3) Minimize traffic noise in business areas:	-2	-1	N	+1	+2
4) Urbanize all undeveloped land:	-2	-1	N	+1	+2
5) Protect natural areas as buffer zones:	-2	-1	N	+1	+2

NEIGHBORHOOD ISSUES:

1) Preserve historic property:	-2	-1	N	+1	+2
2) Protect neighborhoods from truck traffic:	-2	-1	N	+1	+2
3) Landscape streets with trees and shrubs:	-2	-1	N	+1	+2
4) Invite long sections of urban strip development:	-2	-1	N	+1	+2
5) Preserve community character:	-2	-1	N	+1	+2

ECONOMIC ISSUES:

1) Minimize road construction costs:	-2	-1	N	+1	+2
2) Minimize travel time and cost:	-2	-1	N	+1	+2
3) Increase the local population:	-2	-1	N	+1	+2
4) Attract new industry:	-2	-1	N	+1	+2

TRANSPORTATION ISSUES:

1) Have frequent traffic signals on major roads:	-2	-1	N	+1	+2
2) Increase traffic safety:	-2	-1	N	+1	+2
3) Provide bicycle paths to schools and parks:	-2	-1	N	+1	+2
4) Provide vans to shopping areas and downtown to relieve some of the parking demand:	-2	-1	N	+1	+2
5) Provide sidewalks and scenic paths to encourage people to walk instead of drive:	-2	-1	N	+1	+2

COMMENTS:

GOALS & OBJECTIVES SURVEY
TAYLORSVILLE, N.C.

Please rank each group of items in order of importance.
(1 is the most important, 5 is the least important)

RANK HOW ROAD CAPACITY SHOULD BE INCREASED:

_____ By improving the geometric design of intersections:
_____ By constructing additional traffic lanes:
_____ By controlling strip development and promoting campus developments:
_____ By encouraging people to Carpool/Vanpool or use public transportation:
_____ By providing alternative modes of travel such as pedestrian paths or bicycle trails:

RANK WHY ROADS SHOULD BE PLANNED:

_____ To urbanize the rural land outside the town limits:
_____ To increase the tax base:
_____ To control growth:
_____ To revitalize the existing developed areas (such as renovating historic buildings):
_____ To provide citizens knowledge of public intent:

RANK THE ISSUES IN DEVELOPING A THOROUGHFARE PLAN:

_____ Environmental preservation:
_____ Individual home or business preservation:
_____ Community preservation:
_____ New economic development growth:
_____ Community enhancements (such as better roads, quieter neighborhoods, pedestrian trails...):

RANK THE LOCAL PROJECTS NEEDS: (1 through 6)

_____ Third Avenue Extension to SR 1104 (Second Avenue S.W.):
_____ First Avenue Dr. Extension to Third Avenue Dr.:
_____ SR 1104 Extension to SR 1196:
_____ Northwest loop connecting NC 90 to NC 16 to SR 1409 at SR 1415
_____ Connector from SR 1415 to SR 1411 (Marsh Ave.)
_____ Other

ISSUE	NUMBER OF VERY DESIRABLE RESPONSES
ENVIRONMENTAL	
1) Minimize air pollution	5
2) Minimize traffic noise in neighborhoods	6
3) Minimize traffic noise in business areas	2
4) Urbanize all undeveloped land	0
5) Protect natural areas	2
NEIGHBORHOOD	
1) Preserve historic property	3
2) Protect neighborhoods from truck traffic	7
3) Landscape streets with trees and shrubs	7
4) Invite long sections of urban strip development	1
5) Preserve community character	5
ECONOMIC ISSUES	
1) Minimize road construction costs	5
2) Minimize travel time and cost	5
3) Increase the local population	2
4) Attract new industry	8
TRANSPORTATION ISSUES	
1) Have frequent traffic signals on major roads	0
2) Increase traffic safety	9
3) Provide bicycle paths to schools and parks	3
4) Provide vans to shopping areas and downtown	0
5) Provide sidewalks and scenic paths	2

ISSUE/METHOD	FREQUENCY OF #1 RANKINGS
HOW ROAD CAPACITY SHOULD BE INCREASED	
1) Improve the geometric design of intersections:	3
2) Construct additional traffic lanes:	4
3) Control strip development:	1
4) Encourage ride-sharing:	3
5) Provide alternative travel modes:	0
WHY ROADS SHOULD BE PLANNED	
1) Urbanize rural land:	1
2) Increase tax base:	1
3) Control Growth:	4
4) Revitalize existing developed areas:	6
5) Provide citizens knowledge of public intent:	0
RANK THE ISSUES IN DEVELOPING A THOROUGHFARE PLAN	
1) Environmental preservation:	2
2) Individual home or business preservation:	3
3) Community preservation:	1
4) New economic development growth:	5
5) Community enhancements:	2
RANK THE LOCAL PROJECTS NEEDS:	
1) Third Avenue Extension to SR 1104 (Second Avenue S.W.):	2
2) First Avenue Dr. Extension to Third Avenue Dr.:	0
3) SR 1104 Extension to SR 1196:	3
4) Northwest loop connecting NC 90 to NC 16 to SR 1409 at SR 1415:	5
5) Connector from SR 1415 to SR 1411 (Marsh Ave.):	0

APPENDIX D

APPENDIX D

APPENDIX D

RECOMMENDED SUBDIVISION ORDINANCES

DEFINITIONS

I. Streets and Roads

A. Rural Roads

1. Principal Arterial - A rural link in a highway system serving travel, and having characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.

2. Minor Arterial - A rural roadway joining cities and larger towns and providing intra-state and inter-county service at relatively high overall travel speeds with minimum interference to through movement.

3. Major Collector - A road which serves major intra-county travel corridors and traffic generators and provides access to the Arterial system.

4. Minor Collector - A road which provides service to small local communities and traffic generators and provides access to the Major Collector system.

5. Local Road - A road which serves primarily to provide access to adjacent land, over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate, other freeway, expressway, or parkway roads, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.

2. Minor Thoroughfares - Minor thoroughfares perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating minor through traffic movements and may also serve abutting property.

3. Local Street - A local street is any street not on a higher order urban system and serves primarily to

provide direct access to abutting land.

C. Specific Type Rural or Urban Streets

1. Freeway, expressway, or parkway - Divided multilane roadways designed to carry large volumes of traffic at high speeds. A freeway provides for continuous flow of vehicles with no direct access to abutting property and with access to selected crossroads only by way of interchanges. An expressway is a facility with full or partial control of access and generally with grade separations at major intersections. A parkway is for non-commercial traffic, with full or partial control of access.

2. Residential Collector Street - A local street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.

3. Local Residential Street - Cul-de-sacs, loop streets less than 760 meters (2500 ft) in length, or streets less than 1.6 kilometers (1.0 miles) in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.

4. Cul-de-sac - A short street having only one end open to traffic and the other end being permanently terminated and a vehicular turn-around provided.

5. Frontage Road - A road that is parallel to a partial or full access controlled facility and provides access to adjacent land.

6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

II. Property

A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.

B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.

C. Lot - A portion of a subdivision, or any other parcel of land, which is intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

III. Subdivision

A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides of develops any land deemed to be a subdivision.

B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, immediate or future, of sale or building development and all divisions of land involving the dedication of a new street or change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or re-combination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than 4 hectares (10 acres) where no street right-of-way dedication is involved, (3) the public acquisition, by purchase, of strips of land for the widening or the opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than 0.8 hectares (2 acres) into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.

C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. The dedication is made by written instrument and is completed with an acceptance.

D. Reservation - Reservation of land does not involve any transfer of property rights. It constitutes an obligation to keep property free from development for a stated period of time.

DESIGN STANDARDS

I. Streets and Roads

The design of all roads within the Planning Area shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways, as taken or modified from the American Association of State Highway Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the recommendations of the Thoroughfare Plan, as adopted by the municipality.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

A. Right-of-way Widths - Right-of-way (ROW) widths shall not be less than the following and shall apply except in those cases where ROW requirements have been specifically set out in the Thoroughfare Plan.

	Min. ROW	
1. Rural		
a. Principle Arterial		
Freeways	105 m	(350 ft)
Other	60 m	(200 ft)
b. Minor Arterial	30 m	(100 ft)
c. Major Collector	30 m	(100 ft)
d. Minor Collector	24 m	(80 ft)
e. Local Road	18 m[1]	(60 ft)
2. Urban		
a. Major Thoroughfare other than Freeway and Expressway	27 m	(90 ft)
b. Minor Thoroughfare	21 m	(70 ft)
c. Local Street	18 m[1]	(60 ft)
d. Cul-de-sac	Variable[2]	

The subdivider will only be required to dedicate a maximum of 30 meters (100 ft) of right-of-way. In cases where over 30 meters (100 ft) of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 30 meters (100 ft). On all cases in which right-of-way is sought for a fully controlled access facility, the subdivider will only be required to make a reservation. It is strongly recommended that subdivisions provide access to properties from internal streets, and that direct property access to major thoroughfares, principle and minor arterials, and major collectors be avoided. Direct property access to minor thoroughfares is also undesirable.

A partial width right-of-way, not less than 18 meters (60 ft) in width, may be dedicated when

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[1] The desirable minimum right-of-way (ROW) is 18 meters (60 ft). If curb and gutter is provided, 15 meters (50 ft) of ROW is adequate on local residential streets.

[2] The ROW dimension will depend on radius used for vehicular turn around. Distance from edge of pavement of turn around to ROW should not be less than distance from edge of pavement to ROW on street approaching turn around.

adjoining undeveloped property that is owned or controlled by the subdivider; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is sub-divided, the remainder of the full required right-of-way shall be dedicated.

B. Street Widths - Widths for street and road classifications other than local shall be as recommended by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential
   Curb and Gutter section: 7.8 meters (26 ft), face to face of curb
   Shoulder section: 6.0 meters (20 ft) to edge of pavement, 1.2 meters (4 ft) for shoulders

2. Residential Collector
   Curb and Gutter section: 10.2 meters (34 ft), face to face of curb
   Shoulder section: 6.0 meters (20 ft) to edge of pavement, 1.8 meters (6 ft) for shoulders

C. Geometric Characteristics - The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway System or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed - The design speed for a roadway should be a minimum of 10 km/h (5 mph) greater than the posted speed limit. The design speeds for subdivision type streets shall be:

DESIGN SPEEDS (METRIC)			
Facility Type	Design Speed km/h Desirable	Minimum Level	Rolling
RURAL			
Minor Collector Roads (ADT Over 2000)	100	80	60
Local roads including Residential Collectors and Local Residential (ADT Over 400)	80	80	60
URBAN			
Major Thoroughfares other than Freeway or Expressway	100	60	60
Minor Thoroughfares	100	50	50
Local Streets	50	50	30

DESIGN SPEEDS (ENGLISH)			
Facility Type	Design Speed mph Desirable	Minimum Level	Rolling
RURAL			
Minor Collector Roads (ADT Over 2000)	60	50	40
Local roads including Residential Collectors and Local Residential (ADT Over 400)	50	* 50	* 40
URBAN			
Major Thoroughfares other than Freeway or Expressway	60	50	40
Minor Thoroughfares	40	30	30
Local Streets	30	**30	**20

* Based on ADT of 400-750. Where roads serve a limited area and small number of units, can reduce min design speed.

**Based on projected ADT of 50-250.

(Reference NCDOT Roadway Design Manual page 1-1B)

2. Maximum and Minimum Grades

a. The maximum grades in percent shall be:

MAXIMUM VERTICAL GRADE (METRIC)

Facility Type	Design Speed (km/h)	Maximum Grade (Percent) Flat	Rolling	Mountainous
RURAL				
Minor Collector Roads*	30	7	10	12
	50	7	9	10
	65	7	8	10
	80	6	7	9
	100	5	6	8
	110	4	5	6
Local roads including Residential Collectors and Local Residential Streets*	30	-	11	16
	50	7	10	14
	65	7	9	12
	80	6	8	10
	100	5	6	-
URBAN				
Major Thoroughfares other than Freeway or Expressway	50	8	9	11
	65	7	8	10
	80	6	7	9
	100	5	6	8
Minor Thoroughfares*	30	9	12	14
	50	9	11	12
	65	9	10	12
	80	7	8	10
	100	6	7	9
	110	5	6	7
Local Streets*	30	-	11	16
	50	7	10	14
	65	7	9	12
	80	6	8	10
	100	5	6	-

* For streets and roads with projected annual average daily traffic less than 250 or short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table.

(Reference NCDOT Roadway Metric Design Manual page 1-12 T-3)

MAXIMUM VERTICAL GRADE (ENGLISH)				
Facility Type	Design Speed (mph)	Maximum Grade (Percent) Flat	Rolling	Mountainous
RURAL				
Minor Collector Roads*	20	7	10	12
	30	7	9	10
	40	7	8	10
	50	6	7	9
	60	5	6	8
	70	4	5	6
Local roads including Residential Collectors and Local Residential Streets*	20	-	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	-
URBAN				
Major Thoroughfares other than Freeway or Expressway	30	8	9	11
	40	7	8	10
	50	6	7	9
	60	5	6	8
Minor Thoroughfares*	20	9	12	14
	30	9	11	12
	40	9	10	12
	50	7	8	10
	60	6	7	9
	70	5	6	7
Local Streets*	20	-	11	16
	30	7	10	14
	40	7	9	12
	50	6	8	10
	60	5	6	-

b. Minimum grade should not be less than 0.5% .

c. Grades for 30 meters (100 ft) each way from intersections (measured from edge of pavement) should not exceed 5%.

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* For streets and roads with projected annual average daily traffic less than 250 or short grades less than 150 meters (500 ft) long, grades may be 2% steeper than the values in the above table.

(Reference NCDOT Roadway Design Manual page 1-12 T-3)

3. Minimum Sight Distance - In the interest of public safety, no less than the minimum sight distance applicable shall be provided. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters:

SIGHT DISTANCE (METRIC)					
Design Speed (km/h)	30	50	60	90	100
Stopping Sight Distance					
Minimum (meters)	29.6	57.4	74.3	131.2	157.0
Desirable (meters)	30	70	90	170	210
Minimum K* Value for:					
Crest curve	3	9	14	43	62
Sag curve	4	11	15	30	37
Passing Sight Distance:					
Minimum Passing Dist for two lanes, in m	*	*	*	*	*

(General practice calls for vertical curves to be multiples of 10 meters. Calculated lengths shall be rounded up in each case.)

* Currently under revision.

(Reference NCDOT Roadway Metric Design Manual page 1-12 T-1)

SIGHT DISTANCE (ENGLISH)				
Design Speed, MPH	30	40	50	60
Stopping Sight Distance:				
Minimum (ft.)	200	275	400	525
Desirable (ft.)	200	325	475	650
Minimum K* Value for:				
Crest Curve	30	60	110	190
Sag Curve	40	60	90	120
Passing Sight Distance:				
Minimum Passing Distance for 2 lanes, in feet	1,100	1,500	1,800	2,100

(General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case.)

(Reference NCDOT Roadway Design Manual page 1-12 T-1)

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* K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length of the vertical curve which will provide the desired sight distance. Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on

Geometric Design of Highways and Streets, 1990".

4. The "Superelevation Table" shown below shows the minimum radius and the related maximum superelevation for design speeds. The maximum rate of roadway superelevation (e) for rural roads with no curb and gutter is 0.08. The maximum rate of superelevation for urban streets with curb and gutter is 0.06, with 0.04 being desirable.

SUPERELEVATION TABLE (METRIC)

Design Speed	Maximum e*	Minimum Radius m
50 km/h	0.04	100
65	0.04	175
80	0.04	280
100	0.04	490
50	0.06	90
65	0.06	160
80	0.06	250
100	0.06	435
50	0.08	80
65	0.08	145
80	0.08	230
100	0.08	395

e = rate of roadway superelevation, meter per meter

SUPERELEVATION TABLE (ENGLISH)

Design Speed	Maximum e*	Minimum Radius ft.	Max. Deg. of Curve
30 mph	0.04	302	19 00′
40	0.04	573	10 00′
50	0.04	955	6 00′
60	0.04	1,637	3 45′
30	0.06	273	21 00′
40	0.06	521	11 15′
50	0.06	955	6 45
60	0.06	1,432	4 15′
30	0.08	260	22 45′
40	0.08	477	12 15′
50	0.08	819	7 30′
60	0.08	1,146	4 45′

* e = rate of roadway superelevation, foot per foot

(Reference NCDOT Roadway Design Manual page 1-12 T-6 thru T-8)

D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty-five (65) degrees.

2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along the intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.

3. Off-set intersections are to be avoided. Intersections which cannot be aligned should be separated by a minimum length of 60 meters (200 ft) between survey center lines.

E. Cul-de-sacs

Cul-de-sacs shall not be more than 150 meters (500 ft) in length. The distance from the edge of pavement on the vehicular turn around to the right-of-way line should not be less than the distance from the edge of pavement to right-of-way line on the street approaching the turn around. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provisions are made for service access. Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.

2. The width of an alley shall be at least 6.0 meters (20 ft).

3. Dead end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn around facilities at the dead end as may be required by the Planning Board.

G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any con-

struction on the street or road. The application is available at the office of the District Engineer of the Division of Highways.

H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 9.0 meters (30 ft) from the edge of pavement. On streets with curb and gutter, utility poles shall be set back a minimum distance of 1.8 meters (6 ft) from the face of curb.

I. Wheel Chair Ramps

All street curbs being constructed or reconstructed for maintenance purposes, traffic operations, repairs, correction of utilities, or altered for any reason, shall provide wheelchair ramps for the physically handicapped at intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

a. Shoulder section approach

i. Under 800 ADT design year

Minimum 8.4 meters (28 ft) width face to face of parapets, rails, or pavement width plus 3.0 meters (10 ft), whichever is greater.

ii. 800 - 2000 ADT design year

Minimum 10.2 meters (34 ft) width face to face of parapets, rails, or pavement width plus 3.6 meters (12 ft), whichever is greater.

iii. Over 2000 ADT design year

Minimum width of 12 meters (40 ft), desirable width of 13.2 meters (44 ft) width face to face of parapets or rails.

b. Curb and gutter approach

i. Under 800 ADT design year

Minimum 7.2 meters (24 ft) face to face of curbs.

ii. Over 800 ADT design year

Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be a minimum of 450 millimeters (1' 6"), or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

a. Shoulder section approach - Width of approach pavement plus width of usable shoulders on the approach left and right. (Shoulder width 2.4 m (8 ft) minimum, 3.0 m (10 ft) desirable.)

b. Curb and gutter approach - Width of approach pavement measured face to face of curbs.

APPENDIX E

APPENDIX E

APPENDIX E

STREET TABULATION

The street Tabulation consists of an alphabetized street listing, with base year and future year traffic, and the recommended cross section for each street. Proposed facilities follow the listing of existing roadways.

Definitions

Capacity:	Capacity at Level of Service D
1994 ADT:	Average weekday traffic (1994) on existing system
2020 ADT:	Average weekday traffic (2020) on existing system
2020 TP ADT:	Average weekday traffic (2020) on Thoroughfare Plan System
2 ln	Two lane roadway
4 ln	Four lane roadway
ADQ.	Adequate
N.A.	Not available

STREET - SECTION REFERENCE	LENGTH (Miles)	LENGTH (Km.)	EXIST C/S (Ft)	EXIST C/S (m)	EXIST ROW (Ft)	PRACT. CAPACITY	1994 ADT	2020 ADT	REC. C/S	2020 TP ADT
NC 16 (SOUTH)										
S. STUDY LIM. - US 64	0.82	1.32	24 (2 ln)	7.32	60	12000	8000	15200	H	15500
US 64 - 3RD AVE. S.W.	0.75	1.21	22 (2 ln)	6.71	60	12000	4000	7000	H	9500
3RD AVE. S.W.- MAIN AVE. DR.	0.23	0.37	30 (2 ln)	9.14	-	12000	7500	10800	ADQ.	4300
MAIN AVE. DR.- NC 90	0.05	0.08	34 (2 ln)	10.36	-	12000	2000	2200	ADQ.	1600
NC 90 - W. MAIN AVE.	0.10	0.16	40 (2 ln)	12.19	-	12000	8000	10100	ADQ.	4000
W. MAIN AVE. - NC 16	0.32	0.51	30 (2 ln)	9.14	-	12000	9500	13200	ADQ.	2000
NC 16 (NORTH)										
NC 90 - N.E. LOOP	0.79	1.27	22 (2 ln)	6.71	60	11000	8000	13700	H	9600
N.E. LOOP - N. STUDY LIM.	0.87	1.40	22 (2 ln)	6.71	60	11000	7000	11500	H	12000
NORTH EAST LOOP										
*NC 90 - THREE FORKS RD.	0.59	0.95	24 (2 ln)	7.32	(100)	(12000)	-	2500	K	2500
*THREE FORKS RD. - NC 16	0.83	1.34	24 (2 ln)	7.32	(100)	(12000)	-	3000	K	3000
*NC 16 - OLD WILKESBORO RD.	0.43	0.69	24 (2 ln)	7.32	(100)	(12000)	-	6500	K	6500
NORTH WEST LOOP										
*OLD WILKESBORO RD. - BLACK OAK RIDGE RD.	1.42	2.28	22 (2 ln)	7.32	(100)	(12000)	-	4000	K	4000
NC 90										
W. STUDY LIM - US 64	0.49	0.79	24 (2 ln)	7.32	-	12000	5800	12200	ADQ.	12400
US 64 - THREE FORKS RD.	0.51	0.82	24 (2 ln)	7.32	-	12000	3000	4200	ADQ.	2000
THREE FORKS RD - NC 16	0.71	1.14	24 (2 ln)	7.32	-	12000	5000	5300	ADQ.	2400
NC 16 - MAIN AVE. DR.	0.32	0.51	30 (2 ln)	9.14	-	12000	11000	16000	ADQ.	2000
MAIN AVE. DR. - 3RD ST. S.W.	0.10	0.16	40 (2 ln)	12.19	-	12000	8000	10100	ADQ.	4000
3RD ST. S.W. - 1ST ST. N.W.	0.12	0.19	40 (2 ln)	12.19	-	12000	9600	12500	ADQ.	6000
1ST ST. N.W. - MAIN AVE. DR.	0.20	0.32	60 (2 ln)	18.29	-	12000	5500	9400	ADQ.	5000
MAIN AVE. DR. - SR 1413	0.55	0.88	22 (2 ln)	6.71	-	12000	5500	9400	ADQ.	6300
SR 1413 - BOSTON RD.	0.32	0.51	22 (2 ln)	6.71	-	12000	5700	11700	ADQ.	9000
BOSTON RD. - LEWITTES RD.	0.84	1.35	22 (2 ln)	6.71	60	12000	4200	9400	H	6000
LEWITTES RD. - E. STUDY LIM	1.00	1.61	22 (2 ln)	6.71	60	12000	6800	14700	H	14700
US 64										
NC 90 - LILEDOUN RD.	1.11	1.79	24 (2 ln)	7.32	(100)	12000	3200	9000	A	8300
LILEDOUN RD. - SR 1108	0.30	0.48	24 (2 ln)	7.32	(100)	12000	4100	11700	A	10500

STREET - SECTION REFERENCE	LENGTH (Miles)	LENGTH (Km.)	EXIST C/S (Ft)	EXIST C/S (m)	EXIST ROW (Ft)	PRACT. CAPACITY	1994 ADT	2020 ADT	REC. C/S	2020 TP ADT
SR 1108 - NC 16 SOUTH	0.54	0.87	24 (2 ln)	7.32	100	12000	5200	12700	A	11000
NC 16 SOUTH - PAUL PAYNE RD.	0.42	0.68	24 (2 ln)	7.32	100	12000	4700	13700	A	13000
PAUL PAYNE RD. - BOSTON RD.	0.75	1.21	24 (2 ln)	7.32	100	12000	4600	13700	A	13000
BOSTON RD. - LEWITTES RD.	0.67	1.08	24 (2 ln)	7.32	100	12000	3000	11000	A	10500
LEWITTES RD. - E. STUDY LIM	0.96	1.54	24 (2 ln)	7.32	100	12000	3000	6500	A	6500
BOSTON ROAD (SR 1604)										
S. STUDY LIM - US 64	1.27	2.04	20 (2 ln)	6.10	-	10500	1000	800	ADQ.	2000
US 64 - NC 90	0.57	0.92	20 (2 ln)	6.10	-	9500	2200	2800	ADQ.	3100
HAPPY PLAINS ROAD (SR 1108)										
SR 1111 - US 64	0.77	1.24	18 (2 ln)	5.49	-	9000	500	1300	ADQ.	1000
US 64 - 2ND AVE. S.W.	0.78	1.26	18 (2 ln)	5.49	-	9000	2700	2300	ADQ.	3000
2ND AVE. S.W. - NC 90	0.20	0.32	18 (2 ln)	5.49	-	9000	1000	1300	ADQ.	1000
LILEDOUN ROAD (SR 1110)										
S. STUDY LIM - SR 1111	0.55	0.88	18 (2 ln)	5.49	-	9000	2700	4500	ADQ.	4500
SR 1111 - US 64	0.82	1.32	18 (2 ln)	5.49	-	8500	3400	6500	ADQ.	6400
US 64 - SCHOOL AVE. S.W.	0.82	1.32	48 (4 ln)	14.63	-	18000	2000	1500	ADQ.	2000
SCHOOL AVE. S.W. - NC 90	0.20	0.32	48 (4 ln)	14.63	-	18000	4000	6800	ADQ.	10000
THREE FORKS RD (SR 1313)										
N. STUDY LIM - N. LOOP	0.54	0.87	18 (2 ln)	5.49	-	8500	1000	1000	ADQ.	1000
N. LOOP - NC 90	0.42	0.68	18 (2 ln)	5.49	-	8500	1000	1900	ADQ.	1300
OLD WILKESBORO RD. (SR 1409)										
N. STUDY LIM - N. LOOP	0.99	1.59	18 (2 ln)	5.49	-	8500	6200	5600	ADQ.	5500
N. LOOP - 4TH AVE. N.W.	0.61	0.98	18 (2 ln)	5.49	-	8500	6200	6900	ADQ.	6000
4TH AVE. N.W. - 2ND AVE	0.09	0.03	20 (2 ln)	6.10	-	9500	5700	6400	ADQ.	4900
2ND AVE. N.W. - WEST MAIN AVE	0.15	0.05	60 (2 ln)	18.29	-	12000	4000	3900	ADQ.	2100
LEWITTES ROAD (SR 1420)										
ROCKY SPRINGS RD. - NC 90	1.46	2.35	20 (2 ln)	6.10	-	9500	1000	2200	ADQ.	6000
*NC 90 - US 64	0.23	0.37	20 (2 ln)	6.10	100	(9500)	-	11000	G	11000
*US 64 - BOSTON RD.	0.49	0.79	20 (2 ln)	6.10	100	(9500)	-	2500	K	2500

STREET - SECTION REFERENCE	LENGTH (Miles)	LENGTH (Km.)	EXIST C/S (Ft)	EXIST C/S (m)	EXIST ROW (Ft)	PRACT. CAPACITY	1994 ADT	2020 ADT	REC. C/S	2020 TP ADT
ROCKY SPRINGS ROAD (SR 1419)										
E. STUDY LIM - LEWITTES RD.	1.43	2.30	18 (2 ln)	5.49	-	8500	1300	2200	ADQ.	2200
LEWITTES RD. - BLACK OAK RIDGE RD.	0.19	0.31	18 (2 ln)	5.49	-	8500	1300	2300	ADQ.	5000
SR 1418										
E. STUDY LIM - BLACK OAK RIDGE RD.	1.42	2.28	18 (2 ln)	5.49	-	8500	1000	1100	ADQ.	500
MAIN AVENUE DRIVE										
W.MAIN AVE.- 3RD ST. S.W.	0.14	0.23	40 (2 ln)	12.19	-	12000	4200	6100	ADQ.	1000
3RD ST. S.W.- 1ST ST. S.W.	0.12	0.19	60 (2 ln)	18.29	-	12000	1500	2500	ADQ.	2000
1ST ST. S.W.- S. CENTER ST.	0.07	0.11	52 (2 ln)	15.85	-	12000	2000	2800	ADQ.	2000
S. CENTER ST.- W. MAIN AVE.	0.14	0.23	24 (2 ln)	7.32	-	12000	1000	2800	ADQ.	2000
4TH AVE.N.E.- BLACK OAK RIDGE RD										
MAIN AVE. DR.- 4TH AVE. N.E.	0.21	0.34	20 (2 ln)	6.10	-	9500	1000	1700	ADQ.	2000
4TH AVE. N.E. - N. LOOP	1.04	1.67	20 (2 ln)	6.10	-	9500	2000	3200	ADQ.	2300
N. LOOP - SR 1418	0.53	0.85	18 (2 ln)	5.49	-	8500	1300	1900	ADQ.	2000
SR 1418 - N. STUDY LIM	0.68	1.09	18 (2 ln)	5.49	-	8500	1000	1000	ADQ.	1000
SOUTH CENTER ST. (SR 1605)										
S. STUDY LIM - DAVIS AVE.	1.57	2.53	20 (2 ln)	6.10	-	10500	1300	1600	ADQ.	1700
DAVIS AVE. - 3RD AVE. S.E.	0.19	0.31	18 (2 ln)	5.49	-	8000	1500	3600	ADQ.	3800
3RD AVE. S.E. - 1ST AVE DR.	0.23	0.37	18 (2 ln)	5.49	-	8000	1000	1000	ADQ.	1200
1ST AVE DR. - MAIN AVE. DR.	0.12	0.19	22 (2 ln)	6.71	-	11000	2200	2400	ADQ.	2500
MAIN AVE. DR.- NC 90	0.06	0.10	22 (2 ln)	6.71	-	11000	1000	1200	ADQ.	1500
NORTH CENTER ST.										
W. MAIN AVE.- 2ND AVE.	0.15	0.24	66 (2 ln)	20.12	-	12000	1500	2300	ADQ.	2400
SR 1111										
NC 16 - LILEDOUN RD.	1.27	2.04	18 (2 ln)	5.49	-	9000	1000	1000	ADQ.	1000

STREET - SECTION REFERENCE	LENGTH (Miles)	LENGTH (Km.)	EXIST C/S (Ft)	EXIST C/S (m)	EXIST ROW (Ft)	PRACT. CAPACITY	1994 ADT	2020 ADT	REC. C/S	2020 TP ADT
LINNEYS MOUNTAIN RD. (SR 1411)										
4TH AVE. N.E. - BLACK OAK RIDGE RD.	0.95	3.14	18 (2 ln)	5.49	-	8000	1000	1400	ADQ.	1000
1ST AVE. DRIVE S.E.										
NC 90 - DAVIS AVE.	0.31	0.50	20 (2 ln)	6.10	-	9500	1000	2000	ADQ.	4000
*1ST AVE. DR. S.E. - S. CENTER ST.	0.34	0.55	24 (2 ln)	7.32	70	(12000)	-	4200	K	4200
3RD AVE. S.W.										
S. CENTER ST. - 3RD ST. S.W.	0.29	0.47	20 (2 ln)	6.10	-	9500	3000	3500	ADQ.	6100
*3RD ST. S.W. - 7TH ST. S.W.	0.29	0.47	24 (2 ln)	7.32	70	(12000)	-	9200	K	9200
2ND AVE. S.W.										
7TH ST. S.W. - LILEDOUN RD.	0.11	0.18	18 (2 ln)	5.49	30	8000	1100	2700	ADQ.	9800
SCHOOL AVE. S.W.										
LILEDOUN RD. - MILSTEAD ST.	0.29	0.47	24 (2 ln)	7.32	-	12000	1000	2000	ADQ.	3500
*MILSTEAD ST. - JAY DRIVE	0.19	0.31	24 (2 ln)	7.32	70	(12000)	-	1000	K	1000
JAY DRIVE										
SR 1196 - POLK ST. S.W.	0.19	0.31	24 (2 ln)	7.32	-	12000	500	500	ADQ.	1300
POLK ST. S.W. - US 64	0.25	0.40	18 (2 ln)	5.49	-	8000	500	1800	ADQ.	2200
5TH AVE. S.W.										
NC 16 - 6TH ST. S.W.	0.29	0.47	18 (2 ln)	5.49	-	8000	N.A.	N.A.	ADQ.	N.A.
COMMERCIAL PARK DRIVE										
NC 16 - 5TH ST. S.W.	0.18	0.29	20 (2 ln)	6.10	-	9500	N.A.	N.A.	ADQ.	N.A.
5TH ST. S.W. - 5TH AVE. S.W.	0.36	0.58	24 (2 ln)	7.32	70	(12000)	N.A.	N.A.	K	N.A.
6TH ST. S.W.										
5TH AVE. S.W. - 7TH ST. S.W.	0.18	0.29	18 (2 ln)	5.49	-	8000	N.A.	N.A.	ADQ.	N.A.